ACTIVITY NUMBER 8

Analysis of Land and Water Uses

New York State Coastal Zone Management Program

TASK 8.4

STATEMENT OF TASK

Integration of Water Quality Plans with the Coastal Zone Management Program

Products Expected

1. A technical report will be prepared setting forth considerations including: implications of water quality limiting and effluent-limiting segments on future use; needs for land use regulations for non-point source control; dredge spoil disposal policy; prevention and control of oil spills; saltwater intrusion and groundwater quality problems and their solutions.

DEC

Progress

60% complete. Principal input material to this report is taken from information gathered as part of State water quality planning activities carried out under P.L. 92-500 (Federal Water Pollution Control Act Amendments of 1972) or as part of earlier State-sponsored county comprehensive water pollution control studies. This base information is being analyzed from the perspective of water quality impacts upon the coastal zone and conversely, coastal zone impacts upon water quality. There have been no major problems to date in carrying out this analytical work. The writing of the technical report is also under way and a revised outline is available as well as drafts of selected sections.

Prognosis

The technical report to be completed at the end of the second year program will include an introductory section interrelating goals and objectives of both the state's water quality and coastal zone programs, their areas of interface and their common problems. Individual chapters on various specific water quality concerns in the coastal zone will be prepared. These chapters will also distinguish the extent of each type of concern within the various parts of the coastal zone around the state. Concerns to be covered include: point source discharge, combined sewers and storm sewers, disposal of sewage sludge, oil spills and offshore oil production, thermal discharges, discharges from boats and other water-borne equipment, dredge and dredge spoil disposal, nutrient loadings, persistent toxic substances, impacts of non-point source discharges, and groundwater quality (with particular focus on Long Island). It is not expected that any major problems will arise in completing the final technical report by the end of the program year.

TASK 8.5

STATEMENT OF TASK

Continue to Evaluate Water Supply Needs and Problems, and Management of Water Supply Sources in the Coastal Zone

Products Expected

1. Review and discuss critical water supply areas identified in the first year CZM work with local water supply system operators and officials, evaluate information collected in the field survey and develop protective measures for these critical areas. Prepare technical memorandum. *

DEC

Progress

100% complete. A first year draft report consisted of separate sections on water supply needs and management for the Erie-Niagara region, Lake Ontario and the St. Lawrence River, the Hudson River, New York City and Long Island. Initial work done in the second year focused on field surveys of local water supply officials including industrial users. On the basis of the questionnaire prepared during these interviews, a statewide overview of water supply needs was developed. A new section covering the field surveys was added to the original report and the first year draft sections done by separate authors were edited for technical consistency. (One specific conclusion has been drawn from this work: water suppliers feel that there is sufficient protection of water supplies taken from sources in the State's coastal zone based upon existing State and local health and environmental regulations.) *

Recommendations

1. Work programs for all four planning programs - water quality, air quality, coastal zone, and land use - should be adjusted to show the timing and the mechanisms by which interprogram coorindation will be addressed, including many of the items discussed in these recommendations. This should be done by all administering agencies, whatever the level of the jurisdiction - state, regional, county and local. There must be a clear recognition by the staff of each program that one program is formally, by federal requirements, accountable to another. In general the approach of adjusting the work programs is more desirable than that of making cumbersome interagency agreements.

2. Provision should be made for exchange of information, to include:
   - briefings on the work program and progress to date for each of the major programs, for the administrators and key staff of each of the other programs. At the state level in New York this should be done through the State Interagency Planning Committee and in separate meetings where more of the project staff can be present.
   - exchange of interim work products as they become available and discussion of strategies, revised approaches, and major developments in any of the programs.
   - exchange of data, source materials, maps and other information.

3. Cross-review and formal acceptance procedures should be established to cover each of the major products prepared in each program
   - interim products
   - pre-hearing drafts of final reports

4. Advisory Committees for each program should receive a detailed briefing on each of the other major programs, with an emphasis on the points of interaction, potential impacts, and areas of probable conflict. Additionally, there should

be an exchange of membership between the advisory committees for each program and liaison reporting arrangements should be established.

5. The public involvement work in each program should include activities specifically designed to make the public aware of the requirements and relationships of the other programs. In so far as possible this should be done through special sessions at conferences and workshops. It also can be done through newsletters and other mediums.

6. Maximum advantage should be taken of the public review opportunity provided through the A-95 review process for each program and all agencies should allow time in their work schedule for this process. This not only covers annual application for federal planning funds but also will include review of plans submitted for approval. Where these programs are on a tight schedule for completion this could present difficulties.

7. Coordination and consistency must be achieved through the preparation of an Environmental Impact Statement for each completed program. Moreover, in each statement there must be an exposition of the impact of the proposed plans on each of the other major planning programs. Adequate time for the preparation and review of the draft and final EIS must be allowed and, in each case, the requirements of the State Environmental Quality Review Act should be examined.

8. Federal agencies should review work programs carefully as they are submitted by state and other agencies to insure that work elements directed to the problem of interprogram coordination and consistency are included. Elements for integrating air and water quality, CZM and land use should be required.

9. Federal agencies should review their guidelines carefully to determine whether or not their coordination requirements are burdensome, out of date, relative to the timing for completion of the programs, or to current insights into their nature, or conflicting and self-defeating. For example, where pre-submission review have been requested by federal agencies other than the one to which a plan must be submitted, such reviews may be useful but time-consuming. Therefore, it should be made clear that they will run concurrently with A-95 review and other public review. Or - another example - it does not seem practical to use it "single land use element" for both "208" and "701", but it is practical and desirable to attain consistency. This distinction should be made.

10. Federal agencies should attempt to integrate, simplify and reconcile the morass of coordination and consistency guidelines, agreements, regulations and directives applying to these four major programs. Submittal and cross-review procedures at the federal level seem to be an area of particular confusion for example. After having gained some experience with this over the past year or two, this would seem to be an area that could productively receive the attention of the Federal agencies. At the very least the key documents could be assembled and some successful examples of coordination could be elaborated.

11. Federal agencies should take stock of commitments to facilitate joint funding of projects such as statewide data systems, through budgetary transfers, integrated grants or compensatory budgetary adjustments. Despite statements that air and water programs must be integrated through land use programs, EPA, HUD and OCZM have given little attention to the need for pooling and concentrating funds to implement the Land Resources Information System in New York State as a basic land use planning tool which could serve all program interests at any level of government. Encouragement could also be given through this means to combining of program elements. DEC and DOS also should take steps to assist this.

12. State programs should be presented to the Federal Regional Council (Region II) following their submittal to the sponsoring agency for approval.

13. The special coordination requirements of each program should be given attention in the appropriate work program. For example, in the CZM program the state must have coordinated its proposed program with applicable local, areawide and interstate plans on January 1 or later of the year in which the program is submitted for approval.

14. Care should be taken to coordinate the land use and population/employment data and projections developed for the statewide "208" program during the first half of 1977 with the "701" land use program to be submitted to HUD in August, 1977. Particular attention should be given to insuring consistency between this data at the regional, county and local levels of planning and to resolving any conflicts with EDB population data and the State Land Use Program.

15. The State Interagency Planning Committee should be used much more extensively and effectively than it has been to date as a forum for flushing out and resolving coordination issues and conflicts. Moreover, it should be used in this regard for relating these major planning programs to transportation, housing, solid waste, water supply and other functional areas which have received little attention thus far.

16. Consistency requirements of both a formal and informal nature in each program should be made more widely known. For example, it is well known that applicants for federal permits will have to get a state sign-off on the consistency of the proposed action with the state's approved CZM program. However, it is less well known that air and water quality standards are binding on the CZM program or that state and local applicants for federal funding will have to get a sign-off from the "306" agency.

17. Documentation of all interprogram coordination activity needs to be undertaken more systematically, with steps to insure that records will be maintained throughout program development. In the case of CZM, for example, this will be four years or more and while central project files may be kept intact during this period, auxilliary files such as those for the interstate basin commission also should be kept intact. Documentation will be requested for dates and subjects of meetings, participants, coordination steps taken, developing conflicts..

18. Resolution of conflicts between the major programs will be an increasing problem as these programs advance to completion. The state should insist that conflicts of a local nature be resolved locally and procedures and guidelines should be established for this.

19. It may seem too late to some persons to attempt to standerdize data requirements for these major programs. The fact is that all of these programs will be continuing in one form or another and it will be desirable to interrupt a program and improve the data base or coordinative procedures at almost any stage. If it is too late to affect a final product the change will be picked up during the next revision.

20. At the state level ancillary resources could be used much more widely to make the requirements and alternative strategies for these major programs better known. For example, the editors of Newsvane, New York State Environment, and the Conservationist could be made more aware of the interrelationships of these programs and the nature of the programs administered by agencies other than their own. Additional effort is needed to get all of these programs and their interrelationship before the public and local officials in such meetings as those for the Association of Towns and the County Officers Association.

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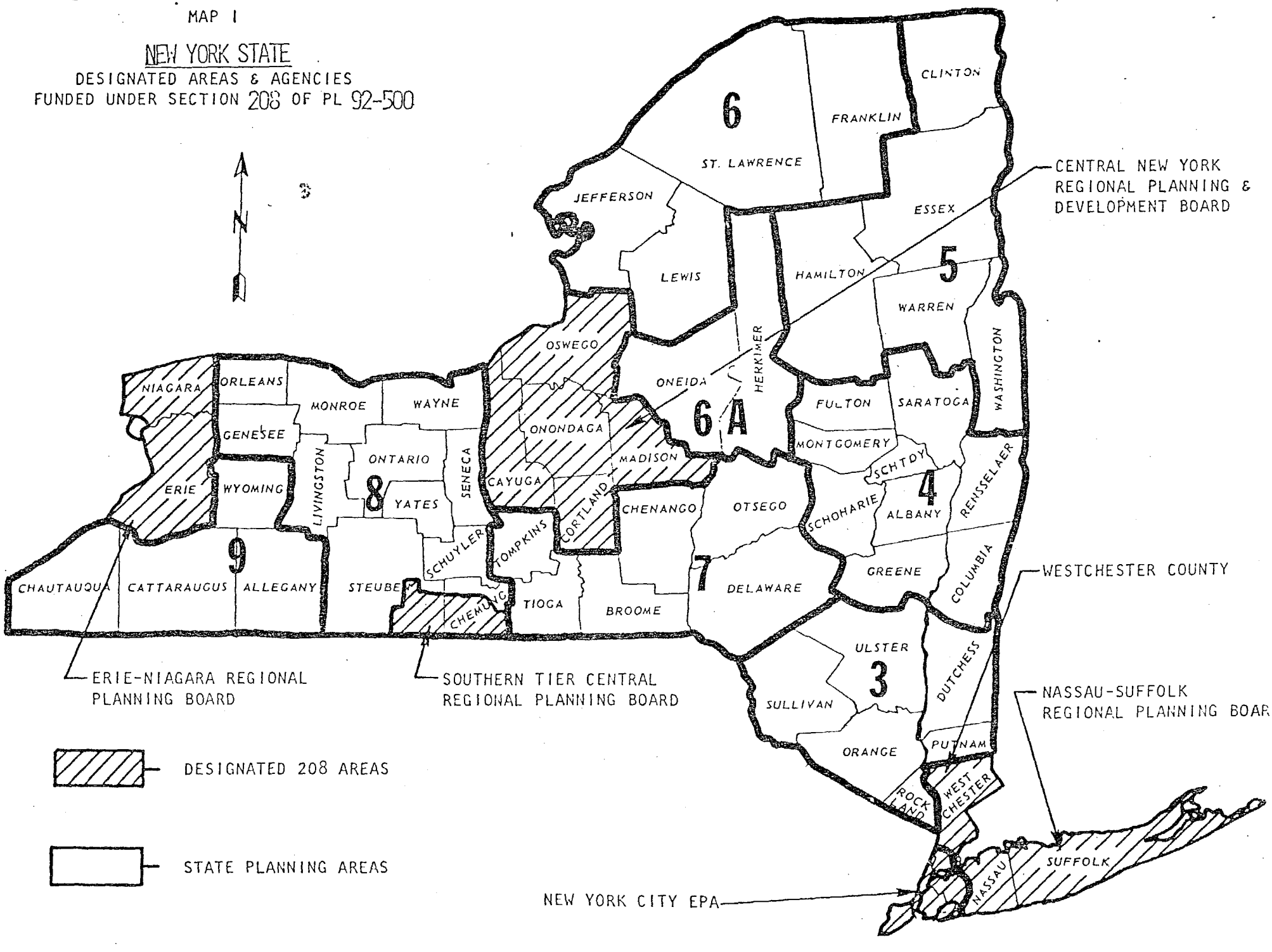
MAP 1

NEW YORK STATE

DESIGNATED AREAS & AGENCIES
FUNDED UNDER SECTION 208 OF PL 92-500



TASK 8.4 Integration of water quality plans for coastal zone areas with coastal zone management program

OUTLINE OF FINAL 2nd YEAR TECHNICAL REPORT
WATER QUALITY AND COASTAL ZONE MANAGEMENT

I. General comparison of CZM and WQM Programs

A. Introduction -- interdependence of land and water -- need for land resources management to complement WQ management in CZ

B. Relationships of WQM planning to other land and water use related programs (AQM, "701", etc.)

C. Legislative purposes (overall goals and objectives) of WQ program (PL 92-500)

D. Legislative purposes (overall goals and objectives)of CZM program (PL 92-583 as amended)

E. Coordination requirements of CZM program to PL 92-500 --- agencies involved

F. Differences and commonalities of "208" WQM program and CZM program.

II. thru XII - Examination of particular aspects of water quality management concerns statewide and by various parts of the coastal zone

-- Each type of concern listed below under II through XII will be examined with respect to:

a - details of laws, policies and regulations for that concern
b - details on monitoring and enforcement to alleviate or minimize specific concern (e.g. permits, fines, specified control equipment)
c - inventory of information available at state and local (regional) level including specific contemporary studies and identification of existing facilities and programs
d - current program development and/or construction activity related to particular concerns
e - overview of public and governmental attitudes, program inadequacies, statewide and particular area problems and potential solutions

II. Point discharges

III. Combined sewers/storm sewers

IV. Sewage sludge disposal

V. Oil spills/oil and grease/OCS drilling

VI. Thermal wastes

VII. Vessel wastes

VIII. Dredging and dredge spoil disposal

IX. Nutrients

X. L. I. Groundwater

XI. Persistant toxic substances

XII. Miscellaneous non-point sources such as air pollution, landfill leachate, erosion control, farming, etc.,

XIII. Summation of individual concerns examined above with general conclusion about their priorities of importance in different parts of the coastal zone

Draft 2/5/77

MAJOR WATER QUALITY FACTORS TO BE CONSIDERED IN THE MANAGEMENT OF NEW YORK STATE'S COASTAL ZONE

(A technical report for Task #8.4 of N.Y. CZM Program)

I. INTRODUCTION

Draft 2/5/77

MAJOR WATER QUALITY FACTORS TO BE CONSIDERED IN THE MANAGEMENT OF NEW YORK STATE'S COASTAL ZONE

(A technical report for Task 8.4 of N.Y. CZM Program)

I - INTRODUCTION

A. Interdependence of Land and Water Planning in the Coastal Zone

Water quality and land use are interdependent. The interrelationships are especially evident in coastal zone areas. These areas are rich in a variety of natural, commercial, recreational, industrial and aesthetic resources of immediate and potential value for which there are competing demands and an urgent need to protect natural systems in the ecologically fragile areas. Air and water pollution stem, for the most part, from activities conducted on the land and measures for mitigation of the pollution of air and water must be implemented primarily on the land.

Provision for all of man's land related activities (land use) -- in some way, virtually everything he does -- is the most integrative element of a comprehensive planning process. This is the case in the coastal zone, as it is elsewhere, not only because such planning must reflect air and water plans, but also because it must reflect other social-economic-environmental decisions concerning land resources and interrelated biological resources. It is on the land where conflicts are most likely to show up from decisions made through more detailed planning for housing, commercial and industrial activity, recreation, transportation, food and fiber production, and non-renewable resource production. "Coordination" and "consistency," therefore must be given special emphasis in governmental activity for the management of all the resources of the coastal zone.

This, or course, includes all water quality management activities and as a consequence mandates the thoughtful integration of water quality management planning with that for the coastal zone. As is shown below, this point did not go unrecognized by Congress at the time the Federal Coastal Zone Management Act of 1972 was passed.

B. Water Quality Planning Relationships to Other Land and Water Related Programs

Much has been written in recent years about the dangers of transferring adverse environmental effects form one medium to another if pollution control plans or measures are implemented along narrow lines without consideration of intermedia effects. Thus, in meeting water quality standards by installing wastewater treatment facilities and interceptors in a growing area, care must be taken not to encourage the type or magnitude of growth that will lead to contravention of air quality standards or place undue development pressure on, for example, nearby flood hazard or unique wetland areas.

Similarly, issuance of air quality permits for complex sources and preparation of regional Air Quality Maintenance Plans must not precipitate developmental sprawl in conflict with policies designed to promote efficiencies in the areas of water pollution control, land use and energy consumption, and maintenance of ecological balances.

Contrary to most thoughts on the subject, a tightening of water quality standards also may lead to sprawl, in that this may make it cheaper to abandon old plants and build new ones rather than undertake expensive modernizations.

This emphasizes the need for coordination of tax policies, transportation, housing, recreation, economic development and other plans with air and water plans to achieve growth patterns that are socially acceptable and economically and environmentally sound. There is an imperative for sound management in the coastal zone, with special emphasis on planning. This specifically means that water quality and coastal zone management plans must acknowlege and strive for consistencies with such plans as:

-- State Air Quality Maintenance Plan

-- Statewide Transportation Plan

-- Statewide Comprehensive Outdoor Recreation Plan

-- Statewide and Regional Solid Waste Management Plans

-- State and Federal Energy Plans and State Energy Facility Siting Planning

-- State and Federal Fish and Wildlife Resoruce Planning

-- Statewide Land Use and Housing Elements of HUD '701" Planning.

C. Overall Objectives of Water Quality Planning Under PL 92-500

Congress, when it passed the Water Pollution Control Act Amendments of 1972 (PL 92-500) provided specific objectives for that program, many of which are closely intertwined with those for coastal zone management. Section 101 of PL 92-500 states:

(1) it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985;

(2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;

(3) it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited;

(4) it is the national policy that Federal financial assistance be provided to construct publicly owned waste treatment works;

(5) it is the national policy that areawide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollutants in each State;

(6) it is the national policy that a major research and demonstration effort be made to develop technology necessary to eliminate the discharge of pollutants into the navigable waters, water of the contiguous zone, and the oceans.

In order to restore and maintain the chemical, physical, and biological integrity of the nation's waters, PL 92-500 has provided for water pollution control through prohibitions, permit systems, planning, certifications, construction grants, etc. These controls are variously applicable to several types of pollutant sources (i.e. municipal point discharges, industrial point discharges, vessel discharges, dredge spoil disposal, sewage sludge disposal, urban runoff, rural non-point sources, etc.) or to several types of pollution (i.e. thermal, toxic chemicals, bacterial and viral contamination, oxygen demanding wastes, suspended solids, etc.)

The existing water quality program in New York State is aimed at restoring and maintaining the quality of the waters of the State. Streams, lakes, and rivers throughout the entire state have been surveyed, and following public hearings, each water body or portion therof has been assigned one of several "best usage" classifications. The assigned classifications are based on the best usage that can reasonable be expected of a water body. Standards of water quality have been established for each of the classifications. Contravention of a standard constitutes pollution. A goal is to eliminate pollution and maintain water quality that will not impede the useage of a water for its assigned best usage. Classifications of waters and standards are periodically reviewed through the public hearing process.

Best use classifications and standards provide but one aspect of water quality control. Requirements for maintenance of discharge free waters, maintenance of waters with better than adequate quality at present higher levels, achievement of "swimmable fishable waters" wherever practicable, and implementation of sediment controls at construction sites are a few additional practices and goals.

In accordance with these goals and practices, the State's "continuing planning" process (Section 303), Areawide Waste Treatment Management Planning Programs (Section 208), Facilities Planning (Section 201), and Comprehensive Water

Resources Planning (Section 209) are programs established under PL 92-500 for the purposes of identifying water quality problems, evaluating alternative abatement measures, and implementing those measures judged to be cost effective.

Areawide waste treatment planning under Section 208 requires an analysis of alternative land management controls and practices to determine those which would be most cost efficient in reducing pollutant loadings. Because such controls are used to achieve a variety of objectives, this analysis should include a review of the consistency of the controls with those required for other programs, policies, and plans. The capability of implementation of the controls and their likelihood of public acceptance also are to be considered. One of the outputs for this analysis must include a demonstration that the land controls, existing and proposed, will be consistent with and reinforce projections of uses and activities for given areas and water quality facilities subplans. The support for much of this comes from Part 130.34 of the EPA's regulations for a State Continuing Planning Process for water quality management and indicates that the plans should be tied with other resources and developmental planning conducted by state, local and federal agencies.

Since such objectives and procedures apply statewide, they obviously have significant application to the state's coastal zone. The Coastal Zone Management Program should set forth objectives, policies and standards to guide public and private use of land and waters in the coastal zone. The standards, criteria and regulations developed through PL 92-500 must be included in the CZM program , and the CZM program is not to establish any additional or substitute water quality standards or criteria to regulate the discharge or runoff of pollutants. The creation and establishment of objectives, policies, and standards for water quality management which do not directly regulate discharges of pollutants are required.

D. Overall Objectives of Coastal Zone Management Planning as They May Relate to Water Quality Management

In its overall declaration of policy, Congress states in Section 303 of the Coastal Zone Management Act of 1972 (PL 92-583) that is shall be national policy: (a) to preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations, (b) to encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone giving full consideration to ecological, cultural, historic, and aesthetic values as well as to needs for economic development, (c) for all Federal agencies engaged in programs affecting the coastal zone to cooperate and participate with state and local governments and regional agencies in effectuating the purposes of this title, and (d) to encourage the participation of the public, of Federal, state, and local governments and of regional agencies in the development of coastal zone management programs. With respect to implementation of such management programs, it is the national policy to encourage cooperation among the various state and regional agencies including establishment of interstate and regional agreements, cooperative procedures, and joint action particularly regarding environmental problems.

The Water Pollution Control Act Amendments of 1972 (PL 92-500) remains the central authority for water quality programs; the Coastal Zone Management Act of 1972 clearly states that requirements of PL 92-500 must be included in all CZM programs. Furthermore, nothing in a CZM program is to conflict with requirements of the Water Pollution Control Act. These principles are contained in Section 307 (f) of the CZM Act:

> (f) Notwithstanding any other provision of this title, nothing in this title shall in any way affect any requirement (1) established by the Federal Water

Pollution Control Act, as amended, or the Clean Air Act, as amended, or (2) established by the Federal Government or by any state or local government pursuant to such Acts. Such requirements shall be incorporated in any program developed pursuant to this title and shall be the water pollution control and air pollution control requirements applicable to such program."

Accordingly, as part of required state/federal consistency requirements in the Coastal Zone Management Act, specific memoranda of understanding and other interagency agreements have been set forth between those agencies responsible for the conduct of the two programs (EPA and NOAA).

E. Coordination Requirements of the Coastal Zone Management Program with the Federal Water Quality Management Program

In August of 1975, the administrators of the federal Office of Coastal Zone management in NOAA and of water quality management programs in EPA released a joint letter spelling out certain coordination principles to be followed by the two agencies. Five particular procedures were stressed:

(1) CZM agencies should make special effort to coordinate with basin and 208 areawide waste treatment management programs in the CZM and vise versa.

(2) Compatability of assumptions, technical criteria and data use and analysis is strongly encouraged.

(3) Participation on advisory, review and working groups for both programs should be coordinated and integrated.

(4) CZM and water quality agencies should exchange progress reports, be alerted of each others key decision points and made aware of alternatives and choices being considered in both programs; there should be special meetings to discuss common problems.

(5) Documentation should be kept of the interactions and interrelationships between the two programs as they are developed, in order that it may be

used at the times of formal review and approval of the CZM and Water quality programs.

Subsequently, a more detailed guidance paper was prepared by OCZM on how to best implement these coordinative procedures.

F. Differences and Similarities of the CZM and WQM Programs

In addition to describing areas of coordination at length, the OCZM guidance paper compares the purposes and workings of the two acts.

Referring to Section 307(f) of the CZM Act, the paper recognizes that the main objective of the EPA program is to restore and maintain water quality, and all other objectives are contributory to that. Differences between the two programs are recognized and include the fact that the CZM program is voluntary for states whereas the water quality program is not. CZM fosters environmental quality but also requires balancing this with concern for developmental interests. CZM focuses on development of a land and water management process, too, rather than upon meeting specific measurable goals and standards as in the case of water quality work. The latter also covers all parts of a state whereas the coastal zone is of more limited geographical definition.

Conversely, sections 302 and 303 of the CZM Act make it clear that Congress was concerned about environmental degradation brought about by unplanned population growth and economic development. Both programs are concerned with water resources and the quality of coastal resources and they do overlap geographically. Both require extensive planning and implementation efforts and often are on the same timetable. In more than half of the coastal states the CZM program is managed by the natural resources - environmental quality agency and therefore CZM and water quality programs are managed by the same agency more often than not. Both programs will affect land and water uses.

The preceding section has stressed the fundamental interdependency of land and water uses in the evolution of both a water quality management and coastal zone management program in New York State.

The following chapters provide details of existing water quality control programs as they relate to the coastal zone. The chapters are devoted to those types of pollution, or to those sources of pollutants, which are of concern to the coastal zone environ. The purpose of the report is to present, in an orderly fashion, the existing water quality controls, to identify opportunities for enhancement of existing programs, and to propose methods for improvement directly through the coastal zone management program. This report is intended to serve as a start form which the CZM planning program may formulate more detailed or additional proposals.

3rd Draft
1/24/77
To Fred Howard

DRAFT

WATER QUALITY - CZM REPORT
I. Introduction

Water quality and land use are interdependent. The interrelationships are especially evident in coastal zone areas. These areas are rich in a variety of natural, commercial, recreational, industrial and esthetic resources of immediate and potential value. There are competing demands on coastal resources and an urgent need to protect the natural systems in the ecologically fragile coastal zone. The State Coastal Zone Management (CZM) Program as authorized through the Coastal Zone Management Act (PL92-583 amended by PL 94-300) is being conducted to identify coastal zone boundaries, and to enhance or create planning and regulatory procedures to protect and wisely develop the resources of the coastal zone.

Several diverse programs exist for planning and regulating land and water uses. Water quality programs are a distinct group of programs, and for convenience and clarity, they are considered somewhat independent of other coastal zone land and water use programs.

The Water Pollution Control Act of 1972 (PL92-500) is a central authority for water quality programs. The Coastal Zone Management Act of 1972 clearly states that requirements of PL 92-500 must be included in all CZM programs. Furthermore, nothing in a CZM program is to conflict with requirements of the Water Pollution Control Act. These principles are contained in Section 307 (f) of the CZM Act:

"(f) Notwithstanding any other provision of this title, nothing in this title shall in any way affect any

requirement (1) established by the Federal Water Pollution Control Act, as amended, or the Clean Air Act, as amended, or (2) established by the Federal Government or by any state or local government pursuant to such Acts. Such requirements shall be incorporated in any program developed pursuant to this title and shall be the water pollution control and air pollution control requirements applicable to such program."

The opportunities for establishing specific Coastal Zone Water Quality Controls are limited but not prohibited. In essence, a state or political subdivision may require only more stringent controls than those developed through the Water Pollution Control Act. Section 510 of PL 92-500 establishes this state authority.

"Sec. 510. Except as expressly provided in this Act, nothing in this Act shall (1) preclude or deny the right of any State or political subdivision thereof or interstate agency to adopt or enforce (A) any standard or limitation respecting discharges of pollutants, or (B) any requirement respecting control or abatement of pollution; except that if an effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance is in effect under this Act, such State or political subdivision or interstate agency may not adopt or enforce any effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance

which is less stringent than the effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance under this act; or (2) be construed as impairing or in any manner affecting any right or jurisdiction of the States with respect to the waters (including boundary waters) of such States."

In order to restore and maintain the chemical, physical, and biological integrity of the nation's waters, PL 92-500 has provided for water pollution control through prohibitions, permit systems, planning, certifications, construction grants, etc. These controls are variously applicable to several types of pollutant source (i.e. municipal point discharges, industrial point discharges, vessel discharges, dredge spoil disposal, sewage sludge disposal, urban runoff, rural non-point sources, etc.) or to several types of pollution (i.e. thermal, toxic chemicals, bacterial and viral contamination, oxygen demanding wastes, suspended solids, etc.)

There are numerous agencies which must coordinate in the implementation of requirements of PL-92-500. Administration of programs at the federal level is primarily through the U.S. Environmental Protection Agency (EPA), the U. S. Army, Corps of Engineers, and the U. S. Coast Guard. At the State level the Departments of Environmental Conservation and Health have primary responsibilities for administering federal and federally sanctioned water quality programs. The Interstate Sanitation Commission has responsibilities in the New York Metropolitan area, the International Joint Committee has authorities in the Great Lakes area, and the St. Lawrence Seaway Authority is a third inter-boundary organization. Region, county, city, town, and harbor

planning and control programs exist. Private organizations and the general public are provided the opportunities for review and comment in permit issuance and planning programs.

The existing water quality program in New York State is aimed at restoring and maintaining the quality of the waters of the State. Assigned "Best Usage" water classifications provide a goal for water quality control. Streams, lakes, and rivers throughout the entire state have been surveyed, and following public hearings, each water body or portion thereof has been assigned one of several "best usage" classifications. The assigned classifications are based on the best usage that can reasonably be expected of a water body. Standards of water quality have been established for each of the classifications. Contrivention of a standard constitutes pollution. A goal is to eliminate pollution and maintain water quality that will not impede the useage of a water for its assigned best usage. Classifications of waters and standards are periodically reviewed through the public hearing process.

Best use classifications and standards provide but one aspect of water quality control. Requirements for maintenance of discharge free waters, maintenance of waters with better than adequate quality at present higher levels, achievement of "swimmable fishable waters" wherever practicable, and implementation of sediment controls at construction sites are a few additional practices and goals. In accordance with these goals and practices, the State's "continuing planning" process (Section 303), Areawide Waste Treatment Management Planning Programs (Section 208), Facilities Planning (Section 201), and Comprehensive Water Resources Planning (Section 209) are programs established under PL 92-500 for the purposes of identifying water

quality problems, evaluating alternative abatement measures, and implementing those measures judged to be cost effective.

The Coastal Zone Management Program is to set forth objectives, policies and standards to guide public and private use of land and waters in the coastal zone. The standards, criteria and regulations developed through PL 92-500 must be included in the CZM program, and the CZM program is not to establish any additional or substitute water quality standards or criteria to regulate the discharge or runoff of pollutants. The creation and establishment of objectives, policies, and standards for water quality management which do not directly regulate discharges of pollutants are required.

The following chapters provide details of existing water quality control programs as they relate to the coastal zone. The chapters are devoted to those types of pollution, or to those sources of pollutants, which are of concern to the coastal zone environ. The purpose of the report is to present, in an orderly fashion, the existing water quality controls, to identify opportunities for enhancement of existing programs, and to propose methods for improvement directly through the coastal zone management program. This report is intended to serve as a start from which the CZM planning program may formulate more detailed or additional proposals.

Draft

1st DRAFT
2/7/77
by Fred Howell

I. Point Discharges

A point discharge is a discernable, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, subdivision, or vessel, or other floating craft, from which pollutants are, or may be, discharged. Discharges to wells, or from industrial and municipal waste treatment plant outfalls, storm sewer outfalls, or cooling water outlets, are point sources of pollution. In contrast, non-point discharges include the precipitation and fallout from the air, stormwater runoff from rural and urban areas, suspended sediments from erosion, resuspension or emission from benthic deposits, and seepage from groundwater.

The discharge of pollutants from point sources is regulated through State Pollution Discharge Elimination System (SPDES) permits (Environmental Conservation Law 3-0301, Art. 17). This State permit system was approved under section 402(b) of the Water Pollution Control Act of 1972 (PL 92-500) and substitutes for permits of the National Pollution Discharge System, the Rivers and Harbors Act, and other discharge permits.

SPDES permits establish effluent limits, self-monitoring requirements, and when necessary, schedules of compliance. Failure to comply with permit requirements may result in permit revocation, penalties, and damage payments. Permits may be issued for period of up to five years. The permit issuing process requires compliance with requirements of Sections 301, 302, 306, 307 and 403 of PL 92-500, and permit issuance is conditional to approval by US EPA, any state with waters affected by

the discharge, the Coast Guard, the Corps of Engineers, and others. Public notice and opportunity for public hearings are also required for permit issuance. Permits on file with US EPA and the State are available for inspection or reproduction.

Permits may be issued for a single point discharge, or for several different point discharges from a single site. The discharges are controlled through chemical, physical and biological effluent limits. These effluent limits are established within the permits to apply to each discharge, or groups of similar discharges as appropriate. The limits are based on the size and type of discharge; the water quality of the receiving waters; and economic, social, political and environmental factors. When abatement is required, interim and/or final effluent limits may be presented within the permit.

Guidelines in establishing effluent limits are included in Section 301 of PL 92-500, which in summary establishes that by July 1, 1977 the:

1. Effluent limits for publicly owned treatment works are to be based upon secondary treatment.
2. Effluent limits for other point sources are to be based on the best practicable control technology currently available (BPCTCA or BPT),
3. Effluent limits for select discharges are to be more stringent, if necessary, to meet water quality standards or any state or federal law or regulation.

This section further requires that by July 1, 1983 the:

1. Effluent limits for publicly owned treatment work are to be based on the best practicable waste treatment technology of studied and evaluated alternative waste management techniques.
2. Effluent limits for other point sources are to be based on the best available technology economically achievable (BATEA).
3. Effluent limits for discharges to publicly owned treatment works are to comply with applicable pre-treatment requirements.

Section 306 in summary:

1. Requires that new sources are to provide the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, no discharge of pollutants.
2. Establishes that point sources constructed to meet all applicable standards of performance shall not be subject to any more stringent standard of performance for 10 years, during the period of depreciation, or during the period of amortization.

Standards of performance for secondary treatment, best practicable control technologies currently available, best available technologies, and best available demonstrated control technologies, have been established by US EPA for each of several types or groups of dischargers. Nationwide, dischargers within a group are equally burdened to provide minimum uniform

abatement measures of process modification, treatment, and/or operating methods. When effluent limits based on these minimum abatement measures are sufficient for achievement and maintenance of "in stream" water quality standards, the receiving waters are termed and "Effluent Limiting Segment". "In stream" water quality standards are based on the "best usage", within natural limitations, that a body of water could be reasonably expected to support. By 1966 the surface waters of the State had been surveyed, indexed and following public hearings, assigned an official Best Usage Classification. Descriptions of best uses and applicable standards are presented for each classification in tables 1, 2 and 3. An up-to-date index of surface waters and their assigned classifications are contained in the Official Compilation - Codes, Rules, and Regulations of the State of New York - Title 6, Conservation.

All fresh and saline groundwaters are presumptively classified as water for salt production, water for desalinization, or fresh or mineral drinking water. Some wells to saline groundwater may, however, be found suited only as a receiving water for disposal of wastes and, provided adjacent and tributary groundwaters will not be impaired, are so classified.

Both classifications and standards are periodically reviewed, subjected to public hearing, and revised if warrented. Suggested revisions and justifications may be submitted to DEC at any time.

In contrast to Effluent Limiting segments, "Water Quality Limited Segments" are waters that are extremely vulnerable to pollution, overburdened by discharges, or too complex for a simple abatement scheme. Abatement in water quality limited segments may, in some areas, be

TABLE

CLASSIFICATIONS AND STANDARDS FOR FRESH SURFACE WATERS

Classification	Best Usage	Conditions of Best Usage	DISSOLVED OXYGEN STANDARDS — Trout Waters: Trout Waters Spawning	Trout Waters: Min. Daily Average	Trout Waters: Min.	Non Trout Waters: Min. Daily Average	Non Trout Waters: Min.	COLIFORM STANDARD[1]: Monthly Median Value	COLIFORM STANDARD[1]: 20% of Sample	COLIFORM STANDARD[1]: Monthly Geometric Mean	pH	Total Dissolved Solids	Phenolic Compounds	RADIOACTIVITY STANDARDS: Gross Beta	Radium 226	Strontium 90
Class AA	Water supply for drinking or food processing	Waters will meet Health Department standards	7 mg/l	6 mg/l	5 mg/l	5 mg/l	4 mg/l	Less than 50/100ml coliforms	Less than 240/100ml coliforms	-----	6.5-8.5	As low as practicable. Less than 500 mg/l	Less than 0.001mg/l (phenol)	Less than 1000μc/l (in absence of Sr^{90} and alpha emitters)	Less than 3μc/l	Less than 10μc/l
Class A	Water supply for drinking or food processing	Waters will meet Health Department standards for drinking water with approved treatment	7 mg/l	6 mg/l	5 mg/l	5 mg/l	4 mg/l	Less than 5000/100ml coliforms	Less than 20,000/100ml coliforms	Less than 2400/100ml fecal coliforms	6.5-8.5	As low as practicable. Less than 500 mg/l	Less than 0.005 mg/l (phenol)	Less than 1000μc/l (in absence of Sr^{90} and alpha emitters)	Less than 3μc/l	Less than 10μc/l
Class B	Contact recreation and other uses except water supply and food processing	------	7 mg/l	6 mg/l	5 mg/l	5 mg/l	4 mg/l	Less than[2] 2,400/100ml coliforms	Less than[2] 5,000/100ml coliforms	Less than[2] 2400/100ml fecal coliforms	6.5-8.5	None detrimental to aquatic life. Waters currently less than 500mg/l shall remain below this limit.	-------	-------	-------	-------
Class C	Fishing and other uses except water supply, food processing and contact recreation	-------	7 mg/l	6 mg/l	5 mg/l	5 mg/l	4 mg/l	-------	-------	Less than[2] 10,000/100ml coliforms and 2,000/100ml fecal coliforms	6.5-8.5	None detrimental to aquatic life. Waters currently less than 500mg/l shall remain below this limit.	-------	-------	-------	-------
Class D	Secondary contact recreation. Waters are not suitable for propagation of fish	Waters must be suitable for fish survival	------	------	------	-------	3 mg/l	-----	------	--------	6.0-9.5	----------	-------	-------	-------	-------
Class N	Enjoyment of water in its natural condition for whatever compatible purposes	No waste discharges whatsoever permitted without approved filtration through soil or equivalent [illegible]	Natural	Natural	Natural	Natural	Natural	Natural	Natural	Natural	Natural	Natural	---------	Natural	Natural	Natural

NOTES:

1) A minimum of five examinations are required.

2) Standard to be met during all periods of disinfection.

3) Additional standards applicable to the above classifications: Turbidity-No increase that will cause a substantial visible contrast to natural conditions; Color-None from man-made sources that will be detrimental to the specified best usage of waters; Suspended, colloidal or other solids-None from any waste discharge which will cause deposition to the best usage of water; Oil and floating substances-No discernible, irretrievable or unsightly deposits or any residue attributable to waste discharges nor visible oil film nor globules of grease; Taste and odor-producing substances, toxic wastes and deleterious substances-None that will be inimical to fish life or which will adversely affect the flavor, color or odor, thereof, or impair the waters for the specified best usage of water; Thermal discharges-No discharge which will be injurious to fish life or to make the waters unsafe or unsuitable for any classified use.

4) With reference to certain toxic substances affecting fish life, the establishment of any single numerical standard for waters of New York State would be too restrictive. There are many waters, which because of poor buffering capacity and composition will require special study to determine safe concentrations of toxic substances. However, most of the non-trout waters near industrial areas in this state will have an alkalinity of 50 milligrams per liter or above. Without considering increased or decreased toxicity from possible combinations, the following may be considered as safe stream concentrations for certain substances to comply with the above standard for this type of water, water of lower alkalinity must be specially considered since the toxic effect of most pollutants will be greatly increased. Ammonia or Ammonia Compounds-Not greater than 2.0 milligrams per liter expressed as NH_3 at pH of 8.0 or above; Cyanide-Not greater than 0.1 milligrams per liter expressed as CN; Ferro or Ferricyanide-Not greater than 0.4 milligrams per liter expressed as $Fe(CN)_6$; Copper-Not greater than 0.2 milligrams per liter expressed as Cu; Zinc-Not greater than 0.3 milligrams per liter expressed as Zn; Cadmium-Not greater than 0.3 milligrams per liter expressed as Cd.

TABLE 26

CLASSIFICATIONS AND STANDARDS FOR MARINE WATERS

Classification	Best Usage	DISSOLVED OXYGEN STANDARD Minimum	COLIFORM STANDARD[1] MPN Any Time	Monthly[2] Median	20%[2] of Sample	Monthly[2] Geometric Mean	TOXIC WASTES AND[3] DELETERIOUS SUBSTANCES	OTHER STANDARDS
Class SA	Shellfishing for market purposes and primary and secondary contact recreation	5.0 mg/l	Less than 70/100ml coliform	----	-----	-------	None in amounts that will interfere with use for primary contact recreation or ... 4	Garbage, cinders, ashes, oils, sludge or other refuse[4]: None in any waters of the entire district as defined by Environmental Conservation Law (§ 17-0105)
Class SB	Primary and secondary contact recreation and any other use except for the taking of shellfish for market purposes	5.0 mg/l	----	Less than 2,400/100ml coliform	Less than 5,000/100ml coliform	Less than 200/100ml fecal coliform	None in amounts that will interfere with use for primary contact recreation or ... 4	pH[3]: The normal range shall not be extended by more than one tenth (0.1) pH unit. Turbidity[3]: No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters the contrast will be due to increased turbidity.
Class SC	Fishing and other uses except primary contact recreation or the taking of shellfish for market purposes	5.0 mg/l	----	----	-----	Less than 10,000/100ml coliform and 2,000/100ml fecal coliform	None in amounts that will interfere with use for secondary contact recreation or ... 4	Color[3]: None from anthropogenic sources that will be detrimental to anticipated best usage of waters. Suspended, colloidal or settleable solids[3]: None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for the specific waters which are assigned to each class.
Class SD	All waters not primarily for recreational purposes, shellfish culture or the development of fishlife and because of natural or manmade conditions cannot meet the requirements of these uses.	3.0 mg/l	----	----	-----	-------	None alone or in combination with other substances or wastes ... 5	
Class I	Secondary contact recreation and any other usage except primary contact recreation and shellfishing for market purposes	4.0 mg/l	----	----	-----	Less than 10,000/100ml coliform and 2,000/100ml fecal coliform	None in amounts that will interfere with use for secondary contact recreation or ... 4	Oil and floating substances[3]: No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
Class II	All waters not primarily for recreational purposes, shellfish culture or the development of fishlife	an average of not less than 30 per cent saturation during any week of the year, provided such saturation levels insure adequate waters to support fish and shellfish life at all times.	----	-----	-----	--------	None alone or in combination with other substances or wastes ... 5	Thermal discharges[3]: No discharge which will be injurious to fishlife or make the waters unsafe or unsuitable for any best usage determined for the specific waters which are assigned to each class.

Notes:

1) A minimum of five examinations are required.
2) Standard to be met during all periods of dilution.
3) The Class II standard applies to toxic wastes, oil, deleterious substances, colored or other wastes, or thermal discharges, ...which will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof or render the waters for any best usage as determined for the specific waters which are assigned to this class.
5) ...in sufficient amounts to prevent survival of fish life or render the waters for any other best usage as determined for the specific waters which are assigned to the class.
4) ...in sufficient amounts to be injurious to edible fish and shellfish, or the culture or propagation thereof, or which shall in any manner affect the flavor, color, odor, or sanitary condition of such fish or shellfish so as to injuriously affect the sale thereof, or which shall cause any injury to the public and private shellfisheries of this state.
7) Applicable to all marine classifications.
8) All [illegible] waters [illegible]

accomplished by requiring all, or some, of the dischargers to the segment to provide extraordinary measures of abatement. The extents to which it is desirable to abate water pollution in water quality limited segments is dependent on state of the art technologies and economic, social, political, and environmental factors. The extents to which abatement can or should be accomplished, is determined through various planning, management, research and development programs, studies and projects. The reviews, approvals and hearings required in establishing or changing SPDES permits provides for a collection, coordination, and evaluation of facts and attitudes. When conflict or competition exists, the permit limits and requirements provides a working compromise.

Water quality limiting segments are identified and designated through the State's continuing planning process (Sec. 303, PL 92-500). The designations are based on estimates of water quality conditions ~~which~~ with present discharges being provided BPT, or with future discharges being provided BPT. Designations may be revised as more accurate estimates are developed and proposals for changes in discharges occur. The State Continuing Planning Process provides preliminary WQL segment designations. Basin Plans, where completed, provide refined designations. Statewide and designated 208 areawide waste management planning will provide further refinement.

Point discharges which are excluded from the SPDES permit ~~system~~ program are described in detail in 6 CCR 751.3 and there within referenced laws and rules. In summary, the following are excluded:

1. Discharges from vessels.

2. Discharges of dredged or fill material.
3. Uncontrolled storm discharges that are not contaminated by industrial or commercial activity (a particular storm discharge that is identified as significant contributor of pollution may be included in the SPDES system).
4. Major steam electric generating facilities for which a certificate is required under article VIII of the Public Service Law.
5. Water, gas or other material injected, with DEC approval, into a well to facilitate production of oil or gas.
6. A discharge in conformance with the national contingency plan for removal of oil and hazardous substances.
7. Additions of pollutants to permitted treatment works, when such additions require only notice.
8. Discharges of less than 1,000 gpd from dwellings to groundwater, which do not contravine water quality standards.

These discharges are excluded from SPDES permit requirements but as can be seen, they are controlled through other programs or laws.

The objectives of PL 92-500 include:

"(1) it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985;) and

"(2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the

protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983."

The SPDES permit program provides coordination of diverse interests, and following adjudication if necessary, establishes levels for abatement and schedules for attainment of these levels.

This permit program, as required by the Coastal Zone Management Act, is to be included unaltered in all Coastal Zone Management Programs. The system provides for periodic reviews, and when necessary, results in changes, to best usage classifications and standards, water quality limited segment designations and individual permit requirements. If the need is found, these existing procedures allow for system improvement within the Coastal Zone.

In addition to directly controling the discharge of pollutants through the SPDES permit program there are numerous ways in which the volumes, strengths, and locations of discharges can be affected:

1. Through land use controls, prohibit development which cannot meet the goal of zero discharge of pollutants. Potential discharges by type or group can be prevented or discouraged from developing in areas where discharges having been provided BPT, would not be of equal or better quality than the receiving waters.

2. Through any practical means, promote the conservation of water. Water conservation will reduce total volumes of discharge and will increase treatment efficiencies. In combined storm and sanitary sewer systems and hydralicly overloaded sanitary sewers, conservation will reduce bypass and overflow volumes and frequencies of occurance.

3. Through government, industry, civil group and individual actions, promote trash, litter, and debris free urban areas. The impact of storm events on water quality may be reduced through regular periodic removal of sediments and debris from sewers, roads, catch basins, and sewer discharge basins.

4. Prohibit the development of new sanitary land fills and discontinue use of existing sanitary land fills as practicable within the Coastal Zone.

5. Insure the cleaning of domestic septic tanks in the coastal zone and surrounding areas on a 3 year cycle with these scavenger wastes being kept separate from other scavenger wastes which may contain heavy metals etc. These sludges being treated and used as soil conditioners.

6. Prohibit development in the Coastal Zone which will require septic tanks.

7. Prohibit gravity sewer pipe installation within the coastal Zone. Allow only installation of sewers that could be pressurized. This type of sewer pipe, under pressure or gravity flow, will eliminate infiltration and exfiltration.

Report
on
Water Supply Studies
for
Coastal Zone Management Program
(Task 8.5)

Prepared by

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Summary

Water Supply Task

Coastal Zone Management

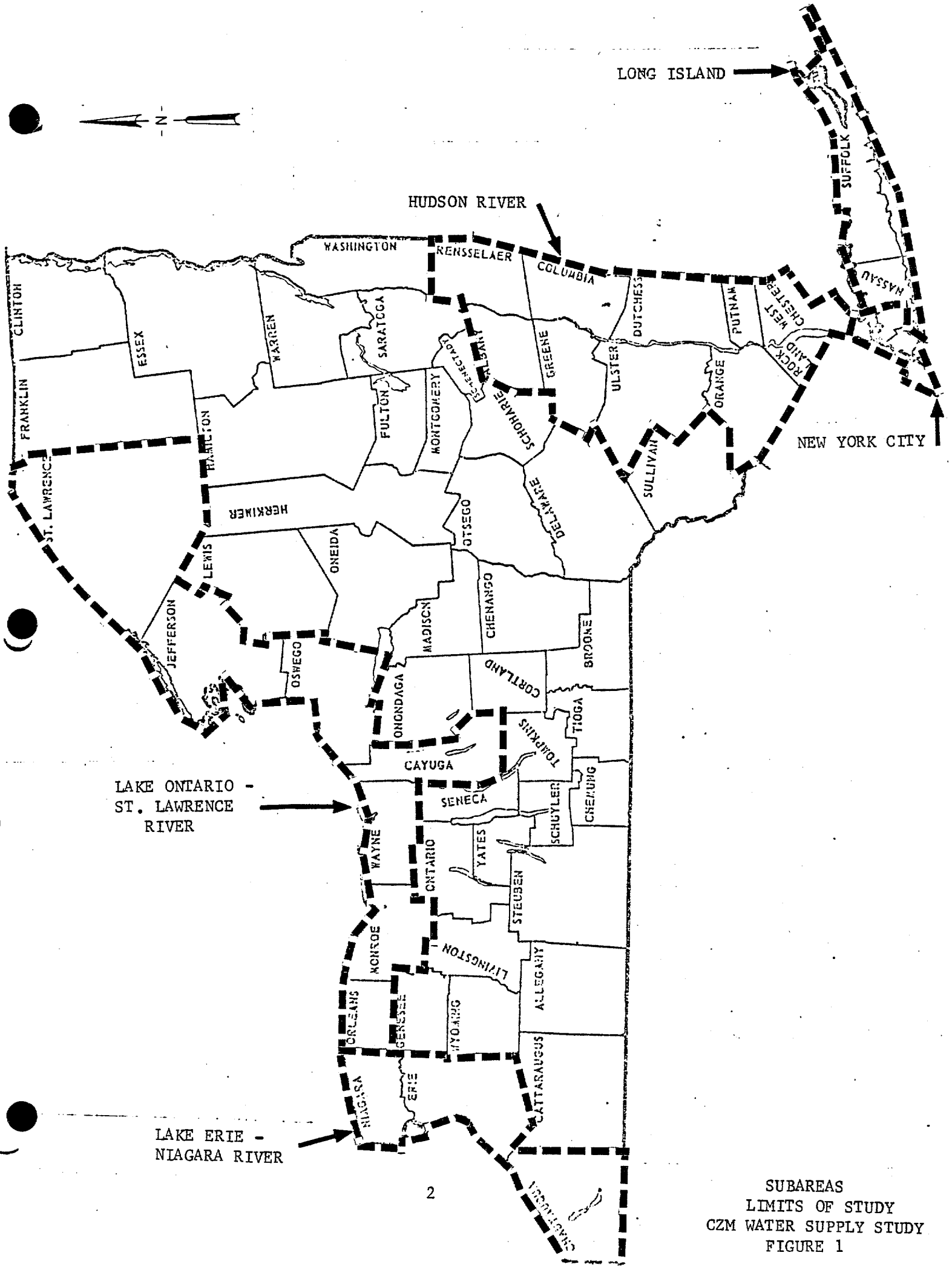
Task Objectives

The coastal zone management program must consider many facets of the environmental picture and form a program that will ensure the harmonic use of the coastal zone resources. The water supply study was undertaken to examine water use along the coastal zone and to identify ways in which the coastal zone management program could protect and safeguard existing and potential future sources of water supply. Another objective was to provide information for determining where the coastal zone boundary line should be by identifying areas along the coast, which from a water supply standpoint should be included within the boundary.

For purposes of the water supply component of the coastal zone management study, the coastal zone area in New York State was divided into the following five subareas:

- the Lake Erie-Niagara River Subarea, which includes all of Niagara County,
- the Lake Ontario-St. Lawrence River Subarea,
- the Hudson River Subarea, which extends from the Federal Dam in Albany and Rensselaer Counties downstream to the New York City Boundary
- the New York City Subarea and
- the Long Island Subarea

These are shown on Figure 1.



SUBAREAS
LIMITS OF STUDY
CZM WATER SUPPLY STUDY
FIGURE 1

Within each subarea water supply was examined on a county by county basis and is presented as such in this report. Within each county, emphasis was placed upon the water supply systems serving communities which are adjacent to the coast. Water supply systems which serve inland areas and take their supply from the coast, such as Onondaga County, were examined in terms of their point of taking to determine if the Coastal Zone Management program could be useful in protecting the source, intake, or associated facilities.

Methodology

After limiting the area of study provisionally to a one county depth, a review was made of all pertinent reports concerning the existing and projected future uses of water within those counties. These reports included the county comprehensive water supply studies, reports of the U.S. Geological Survey, Regional Water Resources Planning Board reports, the Northeastern United States Water Supply Study, and the study by the Temporary State Commission on Water Supply Needs of Southeastern New York. A bibliography for each subarea is included in this report.

Using the above reports, the existing sources of supply, present and future water supply demands, service areas and potential future sources of supply were determined for each water supply system serving a community along the coast. Maps were gathered which show the service areas and sources of supply for these communities. It was, then, possible to identify areas which from a water supply standpoint should be included within the coastal zone. It was also possible to identify areas which could be protected through the Coastal Zone Management Program. Local people, who use the coastal zone areas for water supply purposes, were interviewed in two of the subareas.for a sample of public opinion in regards to coastal zone management.

Findings

1. There are 25 counties and 469 water districts located in the 4 subareas examined in this report. The number of water districts located directly adjacent to the coast is 155.
2. Of these, 109 water districts located directly adjacent to the coast use only upland sources for their supply; 41 water districts use coastal waters only as a source of supply; and 5 water districts use both upland and coastal sources as a source of supply. Figure 2 shows the location of all municipal water supply intakes in the coastal waters.
3. The largest systems using coastal waters are those serving the Buffalo, Rochester and Syracuse areas. The largest system using upland sources is the New York City system.
4. Ground water aquifers are used as a source of supply by 15 municipal systems adjacent to the coast (Fig. 3). Two additional aquifers have been identified as potential future sources of supply.
5. There are 23 industrial firms which are known to use the coastal waters as a source of supply (Figure 4). Probably other industries use coastal waters as a source of supply. However, information on these is not available.
6. Industrial and agricultural water demands in Erie and Niagara counties are supplied by the municipal systems.
7. Local water suppliers do not want more regulations unless they are absolutely necessary. Many feel that the existing regulations administered by the Department of Health and the Department of Environmental Conservation are adequate. Protection of intakes and ground water aquifers are considered important, but most feel that existing laws are adequate if properly enforced.

8. The watershed rules administered by the Department of Health apply to municipal water suppliers only and cover both ground water and surface water sources. These rules could be used to protect the aquifers and intakes in streams within the coastal zone, but might not be directly applicable to the coastal waters due to the "watershed" connotation.

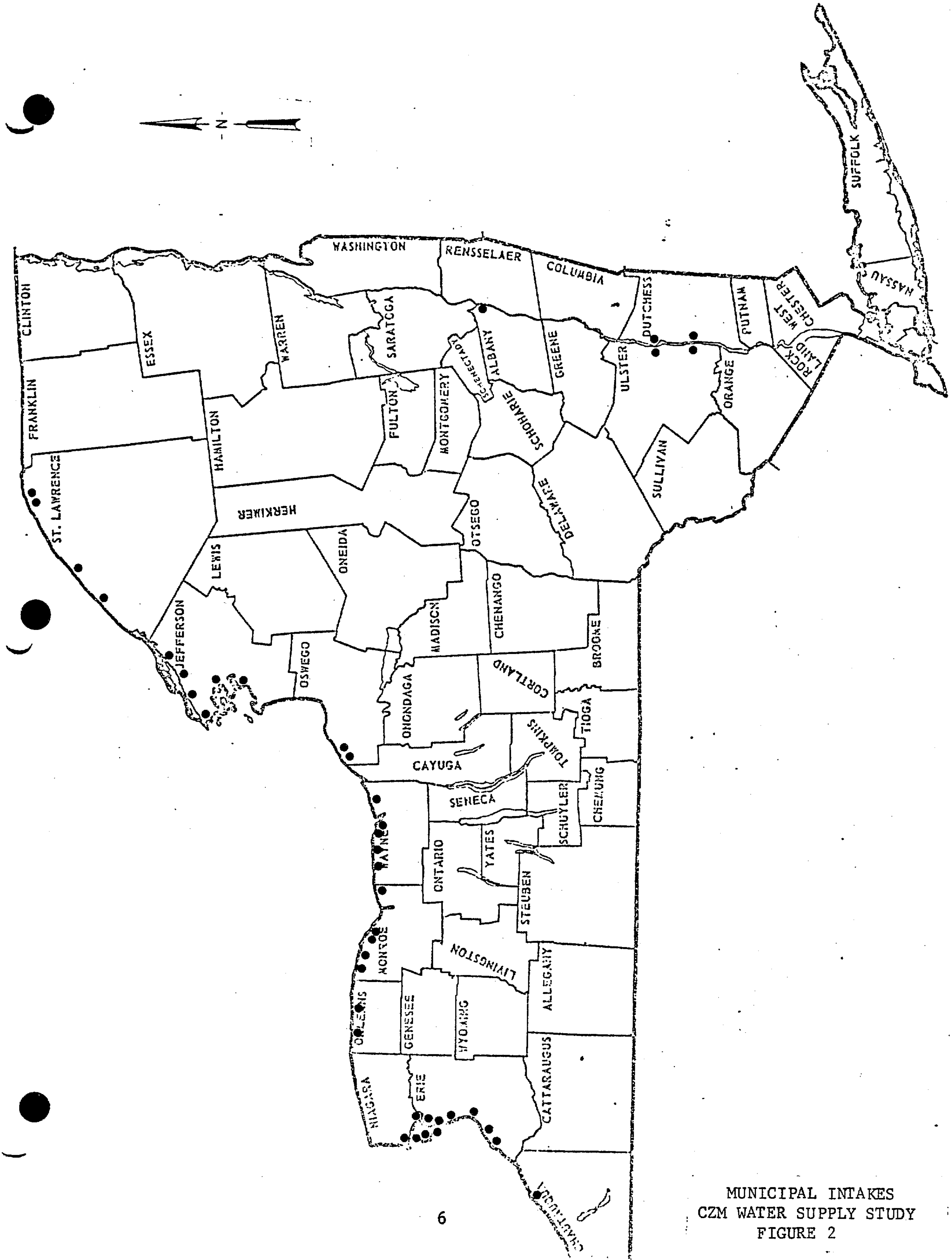
9. The Pure Waters Program administered by the Department of Environmental Conservation controls discharges into all of the waters of the State. All waters including coastal waters are classified by the state. Each classification limits the types and amounts of pollutants that can enter the stream. Additional restrictions can be added by DEC if the discharge is considered detrimental to a downstream intake.

10. Private and industrial users of coastal waters can not be protected directly by the Watershed Rules, but can be protected indirectly by the Pure Waters' Program. Since the acceptable water quality for these users may vary individually, the average Watershed Rules may be too strict for an isolated purpose. The need for additional "protection" is questionable, but additional protection can be provided by inclusion of private and industrial intakes into the purview of existing laws.

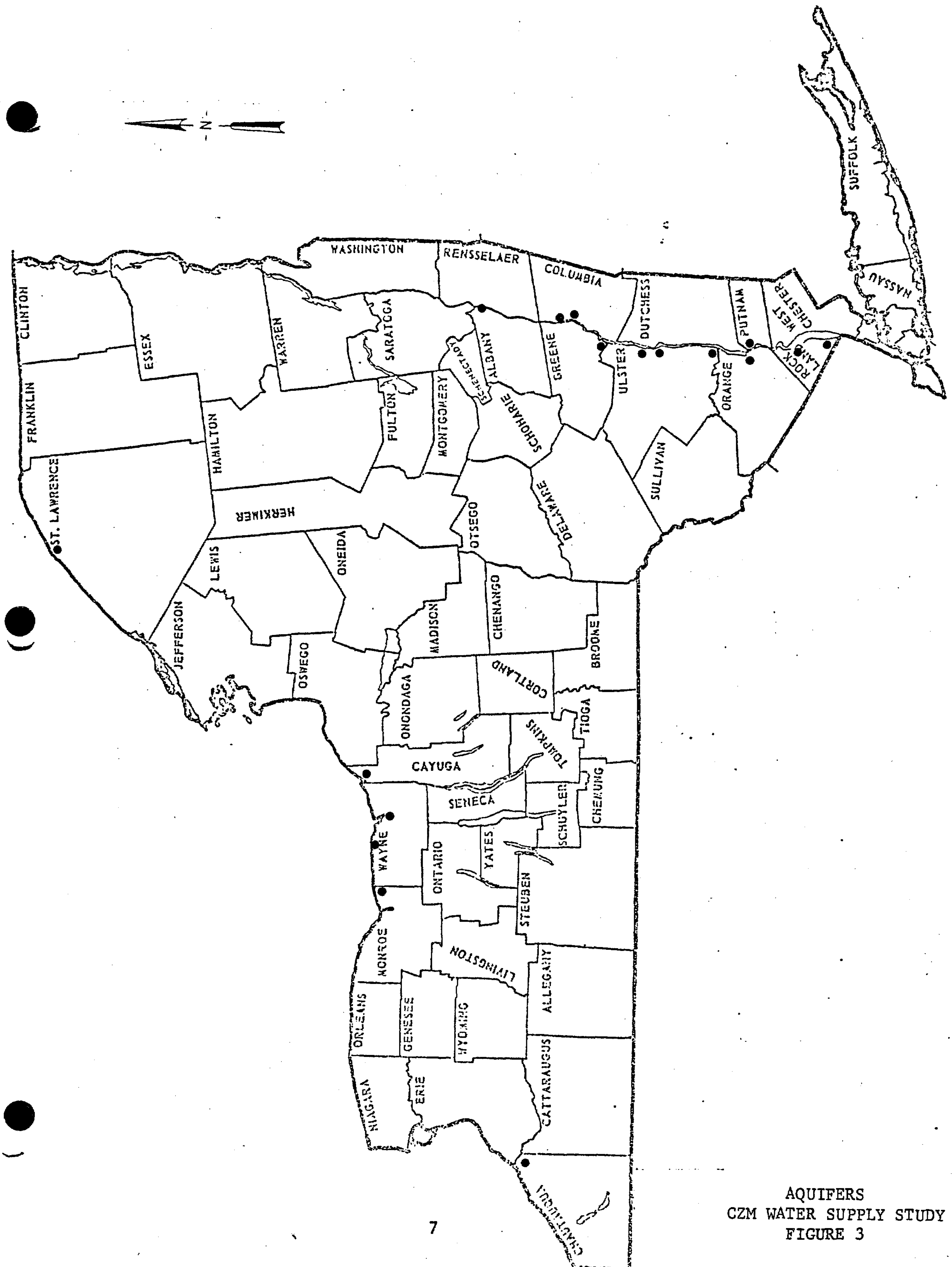
11. Long Island receives all of its water from groundwater. The island is virtually a bubble of fresh water surrounded by salt water. Therefore, the interface between fresh and salt water becomes increasingly important as the population increases.

12. The Department of Environmental Conservation adequately regulates the placement of wells on Long Island considering the location of the salt water/fresh water. Therefore, no further regulations are needed.

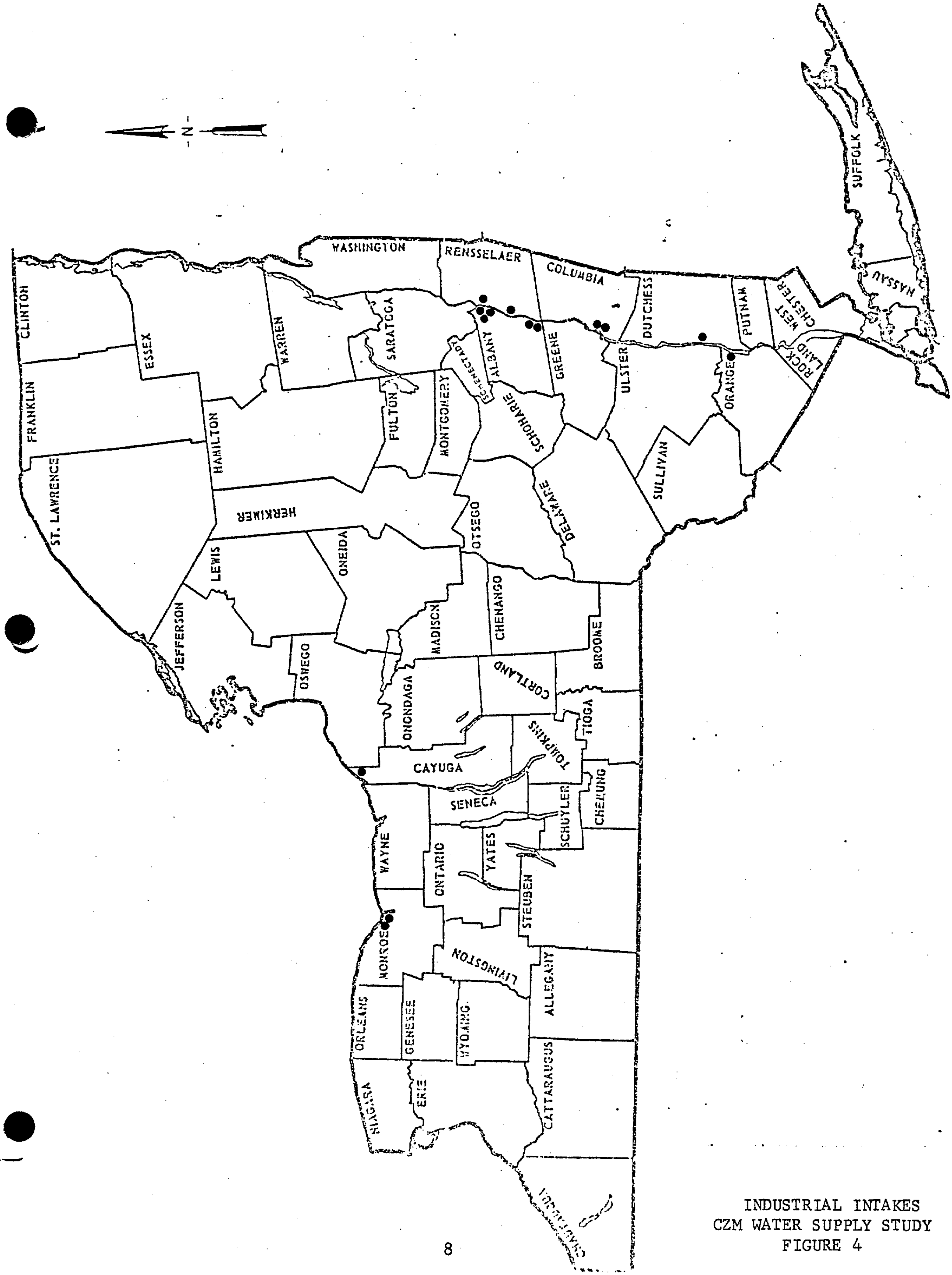
13. It appears that existing regulations are adequate for water supply development within the coastal zone and special water supply regulations under the coastal zone program are not required.



MUNICIPAL INTAKES
CZM WATER SUPPLY STUDY
FIGURE 2



AQUIFERS
CZM WATER SUPPLY STUDY
FIGURE 3



INDUSTRIAL INTAKES
CZM WATER SUPPLY STUDY
FIGURE 4

SECTION I

LAKE ERIE - NIAGARA RIVER SUBAREA

GENERAL

Lake Erie-Niagara River sub-area consists of the three counties of Chautauqua, Erie, and Niagara in the Western New York State. At this time no definite boundary lines of coastal zone have been delineated. In this study, however, the attempt was made to include those areas where the water supply may be affected by large scale coastal zone management programs, and vice versa (Figure I-1).

Public water supply systems provide service to the majority of residents and many industrial and commercial users in the study area. The largest public water supplies serve Buffalo, the town of Tonawanda and the metropolitan Erie County. In the remainder of the sub-area there are twelve smaller public water systems. Large water systems take water from either Lake Erie and the Niagara River. Water sources for small systems are very diversified. They include upland reservoirs, streams, and groundwater aquifers as well as Lake Erie and the Niagara River.

Chautauqua County

Chautauqua County is located on the western boundary of New York State along the southerly shore of Lake Erie. The major economic activities are associated with heavy industry in the City of Dunkirk as well as the agricultural and the resulting canning activities in the remainder of the area.

Most of the county drains southerly through the Allegheny River Basin. The northwesterly portion drains into Lake Erie via Chautauqua, Canadaway, Walnut and Spring Creeks as well as several smaller tributaries.

The potential coastal zone area is underlain by shale with surficial deposits of sand and gravel. The major aquifers are located along the streambeds of Chautauqua Creek, Canadaway Creek and Walnut Creek.

Municipal Water Systems

The county has 17 municipal water systems of which 7 systems are located within the potential coastal zone area. Surface water sources are used by 7 systems within the county or 6 systems within the potential coastal zone area. Groundwater sources are used by 10 water districts within the county or 1 district within the coastal zone area. The water districts within the coastal zone area are listed in Table I-1 and described briefly below.

Village of Silver Creek

Water supply is obtained from two impounding reservoirs along Silver Creek. Dependable yield of the source is about 2.0 mgd, which is considered adequate for present and projected future needs. However, present treatment consists of chlorination only. CPWS-49 recommends that a filter plant be built at a proposed site near the reservoirs about 6 miles from shoreline.

City of Dunkirk

The Dunkirk system takes water from Lake Erie. The existing intake and treatment capacity of 8 mgd is considered adequate to meet present and projected future demands.

Village of Fredonia

The Village obtains water from Fredonia Reservoir located on Canadaway Creek. The present estimated safe yield of the reservoir is 1.94 mgd, which barely meets peak demands during the canning season. CPWS-49 considered a reservoir site on Canadaway Creek at Shumla Fall, but recommend an interconnection with the City of Dunkirk system.

Village of Forestville

The Village obtains its water from 3 springs of unknown yield and a small auxillary well. The supply is barely adequate to meet present demands. Although a reservoir site on Walnut Creek was considered, CPWS-49 recommended that the village develop additional groundwater sources to meet projected demands.

Village of Brocton

The Village takes water from three reservoirs in the Slippery Rock Creek watershed known as Brocton, Risley, and Burr Reservoirs. In an emergency, water can be pumped from Bear Lake into the watershed. Without Bear Lake water, the safe yield of the system is 0.586 mgd. The existing system is considered adequate to meet projected demands with minor modifications to the treatment and distribution system.

Village of Westfield

The Village uses the Chautauqua Creek watershed as its source of water. A reservoir on Minton Creek and an intake on Chautauqua Creek supply the treatment plant by gravity flow. During low flows, water is pumped from Chautauqua Creek downstream from the intake into the Minton Reservoir. The safe yield of the system is estimated as 0.97 mgd. After considering a system using Lake Erie as a source, CPWS-49 recommended that the Village construct a reservoir on Chautauqua Creek.

Ripley Water District

The District takes water from Alford Reservoir on Belson Creek. The safe yield of the reservoir is estimated as 0.33 mgd. After considering the use of Lake Erie as a source of raw water, CPWS-49 recommended further development of Belson Creek.

Self-Supplied Industrial Water Systems

In the study area, canning industry and grape industry are the important economic forces. Private water supply for industrial purpose were estimated by the Allegheny River Basin study to be about 20 to 30 percent of the public water uses. Lake Erie is the major source of privately owned industrial water supply. No further information is available.

Boundary Line Determination

On the basis of this preliminary investigation, no particular consideration concerning water supply situation is needed in establishing the coastal zone boundary line.

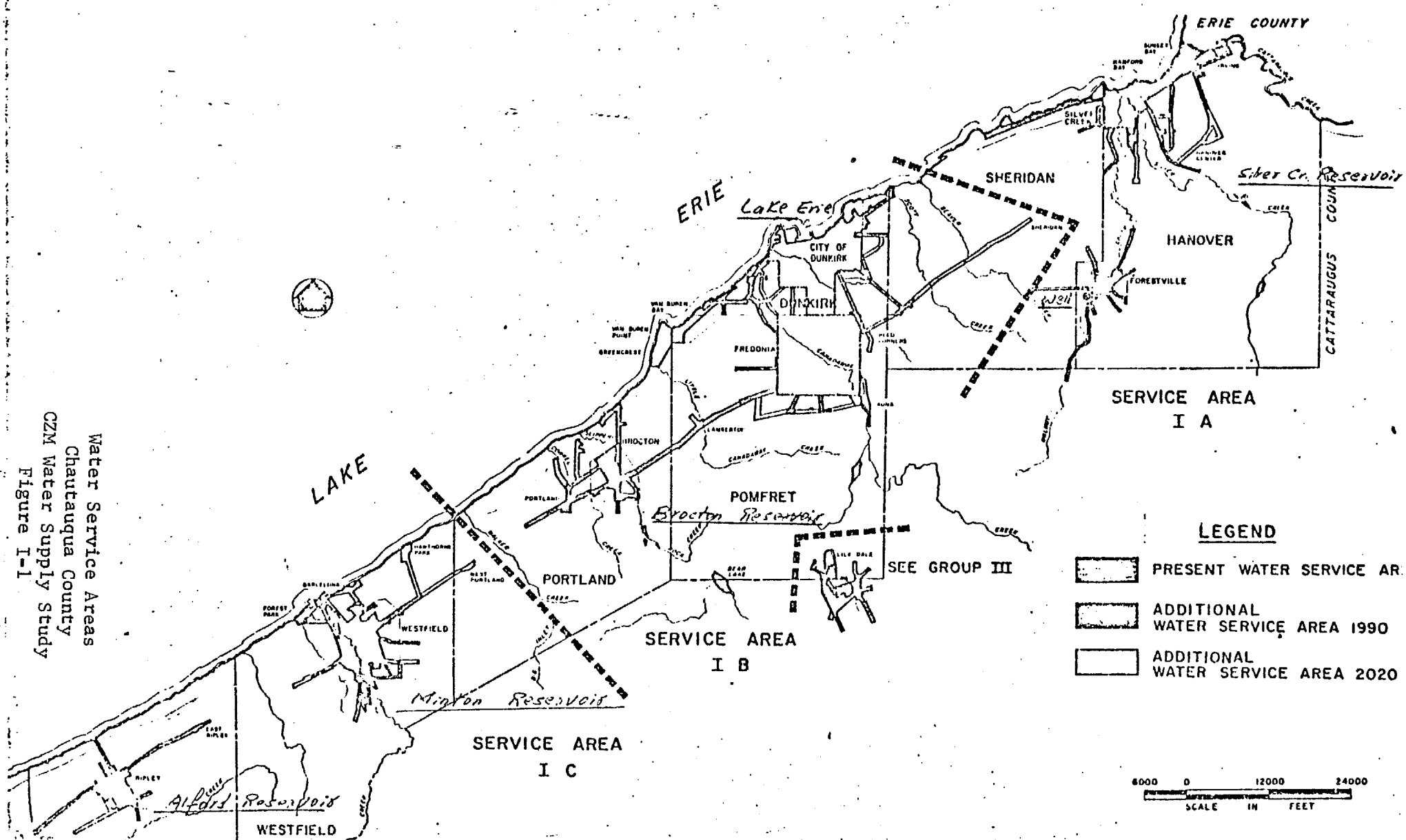
Areas for Protection

All of the new developments are located more than three miles away from coastal zone and thus would not induce any direct impact on coastal zone management. The existing intake from the City of Dunkirk and some existing (unknown) industrial intakes are possibilities. The sites of the intakes considered, but rejected by CPWS-49 are of lesser consideration.

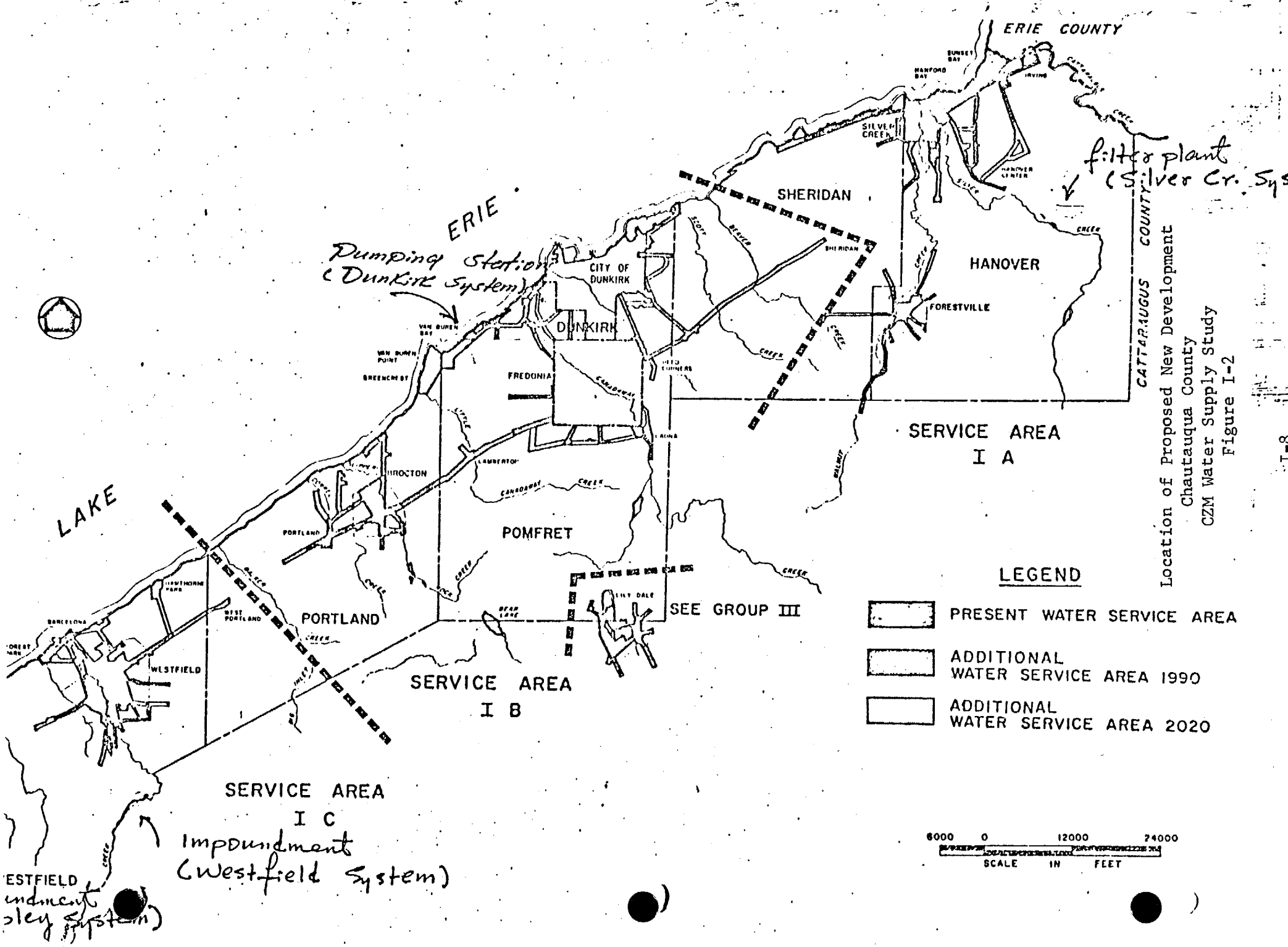
TABLE I-1

Existing Public Water Supply Systems
Coastal Zone Area
Chautauqua County

Water System	Existing Sources & Capacity: Sources	System Capacity (mgd)	Projected Demand (mgd): 1970	1990	2020	Alternatives to Meet Future Needs
Dunkirk	Lake Erie	8.0	4.35	5.14	6.66	
Fredonia	Fredonia Reservoir	1.9	1.31	2.26	3.01	1. Purchase from Dunkirk 2. Canadaway Creek
Westfield	Minton Cr. Reservoir	0.97	0.74	1.05	1.44	1. Chautauqua Reservoir 2. Lake Erie
Silver Cr.	Silver Cr.	2.0	0.26	0.49	0.73	
Brocton	Brocton Reservoir	0.6	0.34	0.43	0.55	
Ripley	Alford Reservoir	0.3	0.12	0.30	0.47	1. Belson Cr. Reservoir 2. Lake Erie
Forestville	Groundwater			0.10	0.14	1. Groundwater 2. Walnut Cr.



Water Service Areas
Chautauqua County
CZM Water Supply Study
Figure I-1



Location of Proposed New Development
Chautauqua County
CZM Water Supply Study
Figure I-2

Erie County

Erie County is located along the easterly shores of Lake Erie and the Niagara River. The major economic activity is manufacturing especially in the primary metals industries.

The entire county drains into the Lake Erie-Niagara System. The major tributaries are Cattaraugus, Tonawanda, Buffalo and Cazenovia Creeks.

The northern quarter of the county is underlain with limestone formations, which are good yielding aquifers. Surficial deposits from the Ice Age overlie the bedrock formations. For the coastal zone area, the valley adjacent to Cattaraugus Creek, which is the southern boundary of the county, is a good yielding aquifer.

Municipal Water Supply Systems

In Erie County, there are 19 public water systems with their own supply facilities. Seven of them take water from either Lake Erie or the Niagara River. The others use **inland** surface water (streams and reservoirs). These systems are listed in Table I-2 and briefly described below.

Erie County Water Authority (ECWA)

This water utility serves about 55 percent of the Erie County population outside of the City of Buffalo. Communities, which are wholey of partly served by the Authority, include the Towns of Amherst, Clarence, Newstead, Cheektowaga, Lancaster, Alden, West Seneca, Elma, Orchard Park, Hamburg, Evans, Eden, Boston, Aurora and the City of Lackawanna.

The E.C.W.A. owns and operates two water treatment plants, Woodlawn and Sturgeon Point. Both plants take water directly from Lake Erie. The Sturgeon plant has a nominal capacity of 50 mgd and the Woodlawn Plant has a capacity of 13 mgd. The Woodlawn plant is recommended for expansion to 38 mgd by 1990 and 78 mgd by 2020. Also, recommended is a new plant to be shared with the Town of Tonawanda in the future.

The City of Buffalo System

The City System takes its water from Lake Erie. Existing intake and other plant facilities are adequate to meet the present and most of the projected future water demands. The system serves the entire City of Buffalo. In addition, the city has a total of six interconnections with the E.C.W.A. and the town of Tonawanda system. These interconnections provide supplemental water supply for E.C.W.A. and the town of Tonawanda during periods of high demands. Expansion of facilities is recommended after the year 2000.

Town of Tonawanda System

The Town of Tonawanda System takes its water from the Niagara River. The intake has a capacity of 150 mgd, which is adequate to meet the present and future water demands. The existing filtration capacity of 24 mgd is recommended for expansion to 136 mgd by the year 2020. The Town of Tonawanda has interconnections with the E.C.W.A. and the City of Buffalo for emergency purposes. CPWS-55 recommends that all 19 systems within the county be incorporated into using 6 sources. Expansion of the Tonawanda System is a vital part of the recommendation.

City of Tonawanda System

The City of Tonawanda System takes its waters from the East Branch of the Niagara River. The system is inadequate in meeting the future demands. CPWS-55 recommended that the city purchase water from the Town of Tonawanda.

Town of Grand Island System

Grand Island receives its major water supply from its own plant and supplemental supply from the Niagara County water district's Wheatfield plant. The town plant takes its water from the West Branch of the Niagara River, which has water of excellent quality. CPWS-55 recommended that the Town become part of the E.C.W.A. system.

Village of Angola

The village takes its water from Lake Erie. The system has a capacity of 0.80 mgd. CPWS-55 recommends that this system be part of the E.C.W.A. system by 1980.

Wanakah Water Company

The company takes its water from Lake Erie. The capacity of the system is 1.0 mgd. CPWS-55 recommends that this system be part of the E.C.W.A. system by 1980.

Self Supplied Industrial Systems

Industrial water use is projected to increase. However, no information is readily available concerning self supplied industrial water systems.

Boundary Line Determination

On the basis of preliminary data no particular consideration concerning the water supply situation is needed in establishing the coastal zone boundary line.

Areas for Protection

The areas surrounding the intakes may need protection.

Table I-2

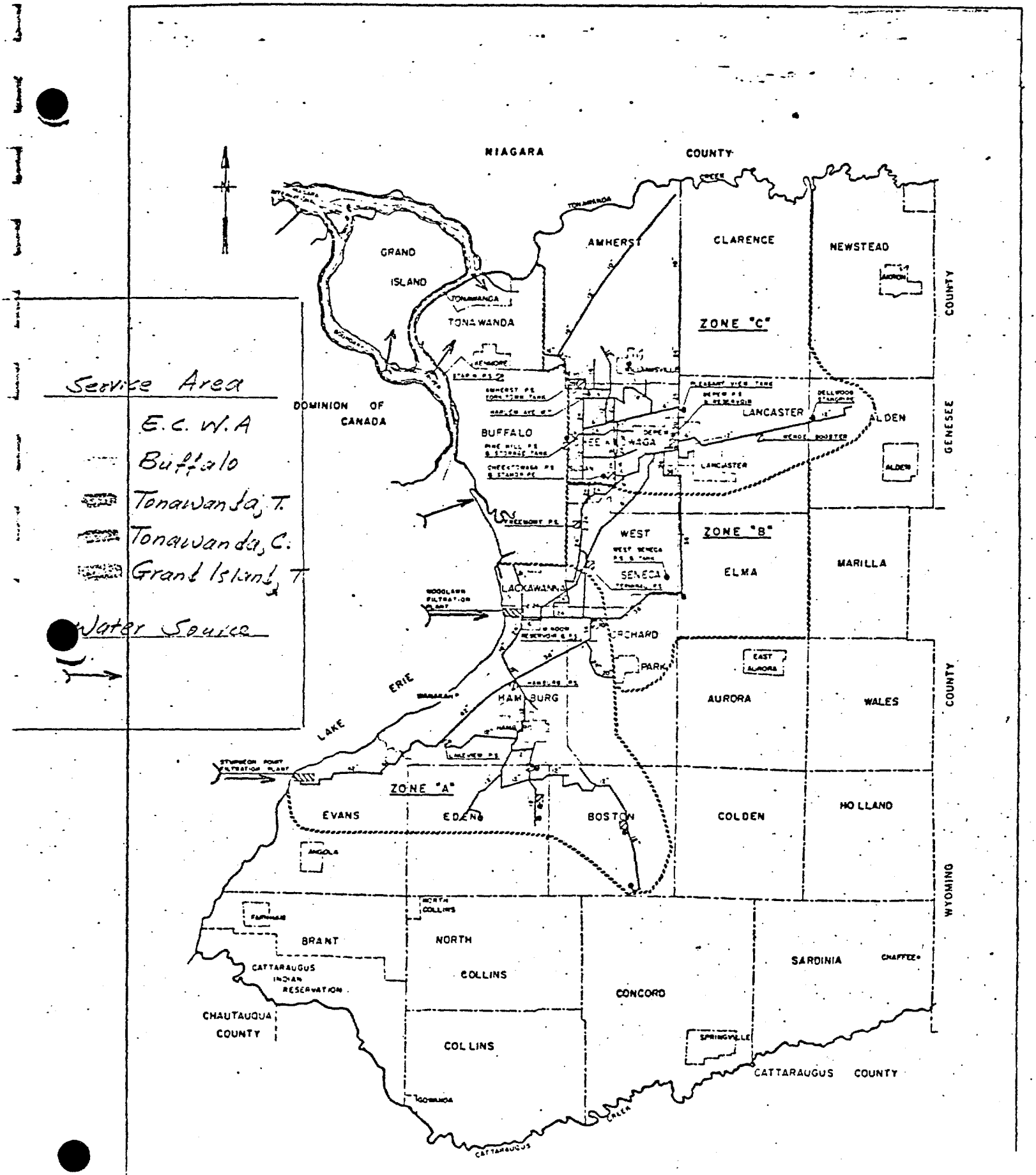
Existing Public Water Supply Systems

Coastal Zone Area

Erie County

Existing Sources & Capacity

Water System	Sources	System Capability (mgd)	Projected Demand (mgd) 1970	1990	2020	Alternatives to Meet Future Needs
Erie County Water Authority	Lake Erie	63	47.5	110.0	224.5	Expand Woodlawn plant
Buffalo (City)	Lake Erie	160	128.0	143.6	168.9	Expand filter plant
Tonawanda,Town	Niagara River	24	22.5	27.4	34.2	Expand filter plant
Tonawanda,City	Niagara River					
Grand Island, Town	Niagara River		1.3	2.9	7.9	Purchase water from E.C.W.A.
Wanakah Water Company	Lake Erie	1.0	0.72			Purchase water from E.C.W.A.
Angola (village)	Lake Erie	0.8	0.75			Purchase water from E.C.W.A.



Water Service Areas
Erie County
CZM Water Supply Study
Figure I-3

Niagara County

Niagara County is located in the northwesterly corner of the State being bounded by Lake Ontario on the north and the Niagara River on the west. The economic activity in the southern portion of the county is closely related to the industrial mix for the Buffalo SMSA with the chemical industry being the major employer in the county. In the northern portion, agriculture is a major economic activity.

The topography of the county is divided into two district parts by the Niagara Escarpment which forms Niagara Falls on the Niagara River and extends easterly through the county. South of the escarpment, the county is drained westerly toward the Niagara River by Tonawanda Creek and other smaller tributaries North of the escarpment, the county is drained northerly to Lake Ontario by Eighteenmile Creek and other small tributaries.

Geologically the southern half of the county is underlain by bedrock of limestone and shale, which are generally considered potentially good yielding aquifers. Surficial deposits of till and drift overlay the bedrock formations and are not considered good aquifers.

Municipal Water Supply Systems

There are four major public water supply systems in the county, which are serving about 90 percent of the population. All of the systems use the Niagara River as its source. The characteristics of these systems are summarized in Table I-3 and described briefly below.

Niagara Falls City System

The City of Niagara Falls draws water from the West Branch of the Niagara River at a point between Navy Island and Grand Island. The intake has a safe yield of 80 mgd. The existing filtration plant has a rated capacity of 64 mgd.

The City also supplies water to the Villages of Lewiston and Youngstown as well as a strip area along the Niagara River to Fort Niagara State Park. The capacity of existing facilities will soon be exceeded. Expansion of existing facilities at same location is recommended by CPWS-59.

North Tonawanda City System

Water for the City of North Tonawanda is obtained from the East Branch of the Niagara River. The existing intake's capacity of 40 mgd is considered adequate for present and for the projected future use.

Lockport City System

The City of Lockport obtains water from two sources. The City owns a treatment plant,which draws water from the East Branch of the Niagara River near the north end of Tonawanda Island and has a capacity of 30 mgd. The City also purchases supplemental water from the Niagara County Water District in periods of high demand . CPWS-59 recommends further reliance on the NCWD system.

Niagara County Water District

The District takes water from the West Branch of the Niagara River. It serves the 12 towns of the County, the villages of Wilson and Barker, and part of the Village of Middleport. The District also supplies water to the Village of Medina and environs in Orleans County and to the northern half of the Town of Grand Island in Erie County.

The intake of this system is capable of carrying a total flow of about 100 mgd, which is adequate to meet the projected needs for 1980. After that, a new intake at the Hamlet of Oleott is recommended to take water from Lake Ontario. Later, another intake into Lake Ontario at Youngstown is recommended. CPWS-59 also recommends the

expansion of the Wheatfield filter plant from the existing capacity of 20 mgd to 114 mgd for projected needs in 2020.

Self Supplied Industrial Systems

There are a large number of industries in Niagara County. They obtain water wholly or partly from public water system, which are evaluated as part as the public system needs.

Boundary Line Determination

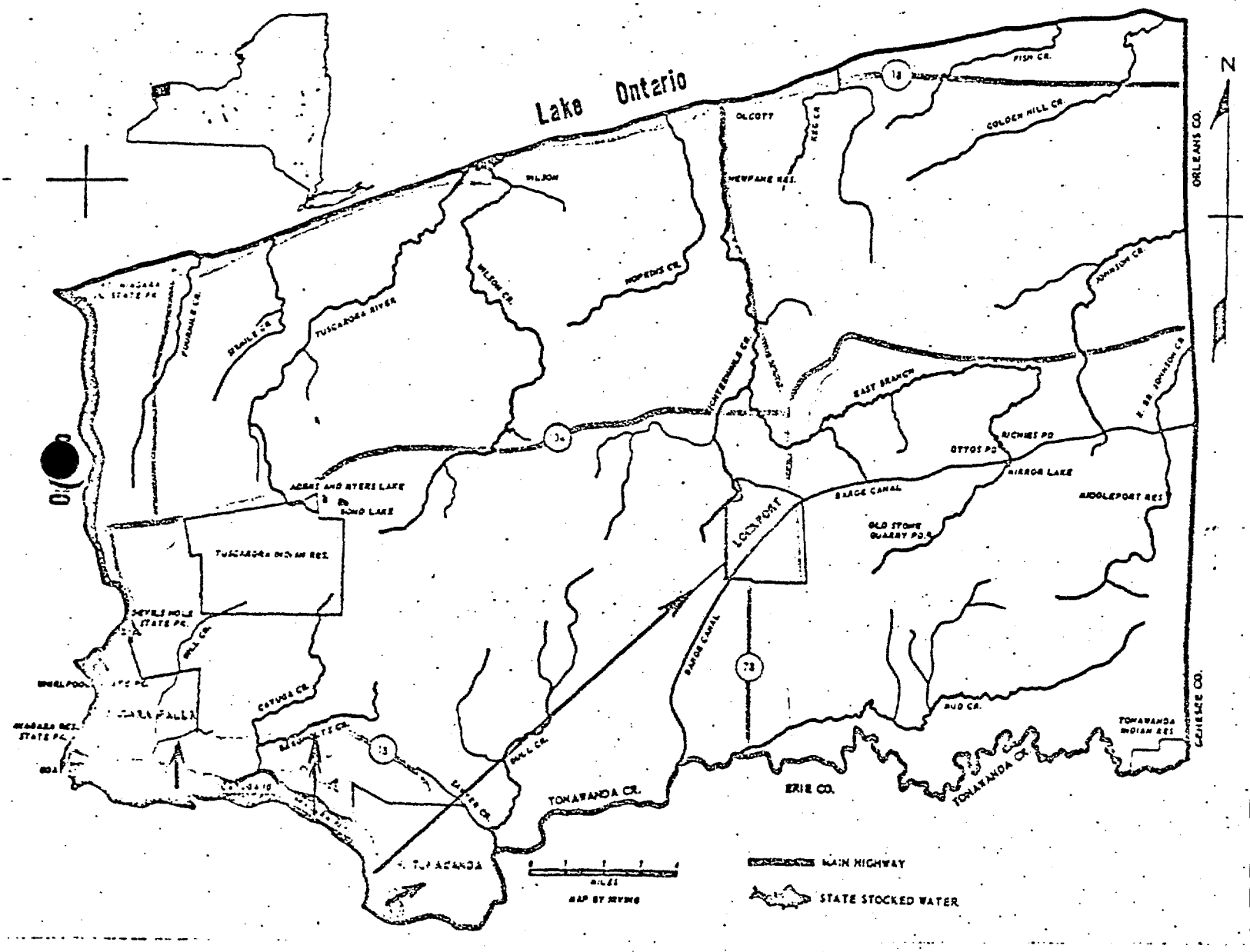
There are no specific considerations for the determination of the boundary line.

Areas for Protection

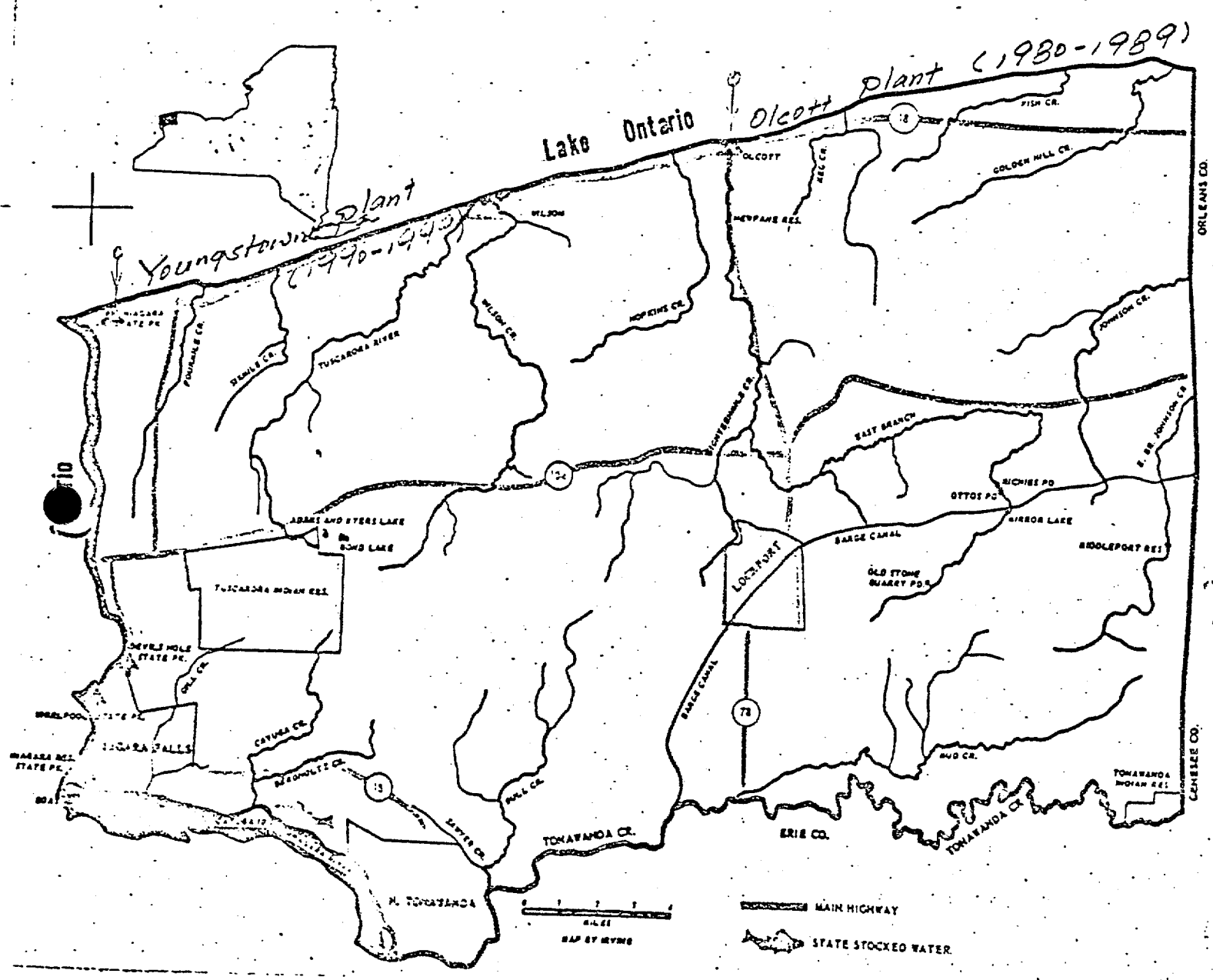
Except for the possible protection of the areas surrounding the intakes, there appears to be no areas for protection.

Table I-3
Existing Public Water Supply Systems
Coastal Zone Area
Niagara County

Water System	Existing Sources & Capacity: Sources	System Capacity (mgd)	Projected Demand (mgd): 1970	1990	2020	Alternatives to Meet Future Needs
Niagara Falls, City	Niagara River	64	52	68	90	Expand intake capacity
N. Tonawanda, City	Niagara River	40	14	22	39	Obtain water from NCWD
Lockport, City	Niagara River	30	15	19	25	Obtain water from NCWD
Niagara Co. Water District (NCWD)	Niagara River	100	40	86	214	1. Lake Ontario 2. Expand intake Capacity



Water Service Areas
Niagara County
CZM Water Supply Study
Figure I-4



Potential Water Sources
Niagara County
CZM Water Supply Study
Figure I-5

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3. "Comprehensive public water supply study, Erie County, CPWS-55," by Greeley & Hansen Engineers, 1970

4. "Comprehensive public water supply study, Niagara County, CPWS-59," by Greeley & Hensen Engineers, 1970

5. "Erie-Niagara Basin, Comprehensive Water Resources Plan," by New York State Water Resources Commission, 1969

6. "Water utility management information series for local officials," Bulletin No. 3, State of New York, 1970

SECTION II

LAKE ONTARIO - ST. LAWRENCE RIVER SUBAREA

GENERAL

The Lake Ontario-St. Lawrence River Sub-area covers more than 300 miles of shoreline in New York State with approximately two-thirds of this amount bordering Lake Ontario. Eight counties are involved: Niagara, Orleans, Monroe, Wayne, Cayuga, Oswego, Jefferson and St. Lawrence. For convenience, Niagara County was included in the Lake Erie-Niagara River Sub-area and will not be considered further in this section. The combined population of the remaining seven counties, according to the 1970 Census, is slightly over 1,200,000. In addition to this, Onondaga County, with a population of 472,000, is a major user of Lake Ontario water, and therefore has a significant influence on the Lake Ontario coastline. Added to this amount must be the large number of people who use the coastline for recreational purposes. The State Parks along the coastline of Jefferson and St. Lawrence counties serve over one million visitors annually. So, perhaps 3.5 to 4.0 million people affect the coastline of the Lake Ontario - St. Lawrence River Sub-area.

Thirty-three public water supply systems affect the coastal area within the Subarea, either by using the coastal waters as a source of supply or by the proximity of their potential service areas to the coastline. These systems supplied about 825,000 permanent residents as well as many tourists and industrial and commercial concerns in 1970. The average daily demand was about 132 MGD.

The vast quantities of water available from Lake Ontario and the St. Lawrence River make these sources very attractive to water supply planners. The water quality is, overall, excellent. Greater development of these coastal waters as a water supply source by communities outside the coastal zone can be expected.

Most of the data contained in this section was obtained from the county Comprehensive Public Water Supply Studies. A bibliography of all sources appears at the end of the section.

Following is a county-by-county compilation of the water supply systems in the vicinity of the Sub-area's coastline and an analysis of their effect on the coastal araa.

ORLEANS COUNTY

Orleans County can be classified as a rural area. Its economy is principally based on agriculture, although some of its work force is employed in the Buffalo and Rochester areas. Population growth through 1995 is expected to be moderate, compared to the State average, with most of the growth occurring adjacent to the villages.

The northern part of the county comprises a moderately flat or undulating plainlike area, part of the Ontario plain. It has no abrupt or sudden changes in relief. The shoreline bordering Lake Ontario is fairly even with no deep bays or indentations. Along the edge of the lake, there is an abrupt bluff rising from the lake shore to the plain which ranges from 5 to 40 feet in height. This is bordered by a narrow gravel beach, ranging from 10 to about 25 feet in width, that extends from the foot of the bluff to the water's edge.

Lake Ontario has a modifying effect on the climate of the northern half of the county which makes it suitable for the growth of fruit. Large scale fruit growing is prevalent here. Fruit processing and canning in the autumn creates a heavy demand for water in some areas.

The drainage system of Orleans County consists of several small streams which drain directly into Lake Ontario. The largest of these is Oak Orchard Creek. The Barge Canal runs east-west through the middle of the county. There are no lakes of any significant size.

Groundwater is not prevalent in the county in any great amounts. Areas not served by public systems must rely on individual wells which frequently fail to provide sufficient water of suitable quality throughout the year. An evaluation of the aquifers in the county was made for the Orleans County Comprehensive Public Water Supply Study. Indications were that it is unlikely that groundwater sources could provide dependable supplies for new local systems.

A. Description of Public Water Supply Systems

There are six water supply service areas in the county. Four of these systems receive all or part of their supply from water systems in adjacent counties. Yates Water District #2 and the Village of Medina are supplied by the Niagara County Water District. The Kendall-Hamlin Water District and the Village of Holley are connected to the Brockport, Monroe County, system. The Villages of Albion and Lyndonville obtain their water supply from Lake Ontario. Following is a description of those systems affecting the coastal area.

1. Village of Albion

In addition to the Village, the system serves the hamlets of Gaines and Childs in the Town of Gaines, and Oak Orchard-on-the-lake in the Town of Carlton from Lake Ontario. The system is capable of meeting anticipated demand for at least the next 15 years. Expansion of the treatment facility would be required to meet projected increased demands and expansion to adjacent suburban areas.

2. Village of Lyndonville

The Lyndonville system serves the Village of Lyndonville and the hamlets of Yates Center and Shadigee. Water is pumped from Lake Ontario and is processed at a treatment plant located adjacent to the lake. The treatment plant is more than 50 years old, but it is still in good condition. The plant has a rated capacity of 0.20 mgd which is sufficient to meet Lyndonville's needs through the study period. However, it is approaching the end of its economic life and will eventually have to be replaced.

The Comprehensive Water Supply Study presents information for new water systems to serve hamlets in the county projected to have 80 or more homes by the year 1990. Because of the general inadequacy of groundwater supplies in the county it is assumed

that the new systems would have to obtain their supply from existing village systems. Locations of the proposed new service areas near the coastal zone are shown on Figure II-1 These systems are not now economically feasible.

Table II-1 summarizes the present and projected demands for the Villages of Albion and Lyndonville and the alternatives for meeting their future needs.

B. Boundary Line Determination

From a water supply point of view it isn't important where the boundary line is established. The shoreline is quite straight and, once past the bluff at the lakeshore, the land is quite flat. These factors make a boundary line 500-1,000 feet from the shoreline look reasonable. Most of the shoreline development appears to be vacation homes quite close to the lake. It should be noted that, since in many areas wells drilled for individual homes prove to be inadequate, the control of the spread of service areas into coastal zone areas can be a useful management tool.

C. Areas for Protection

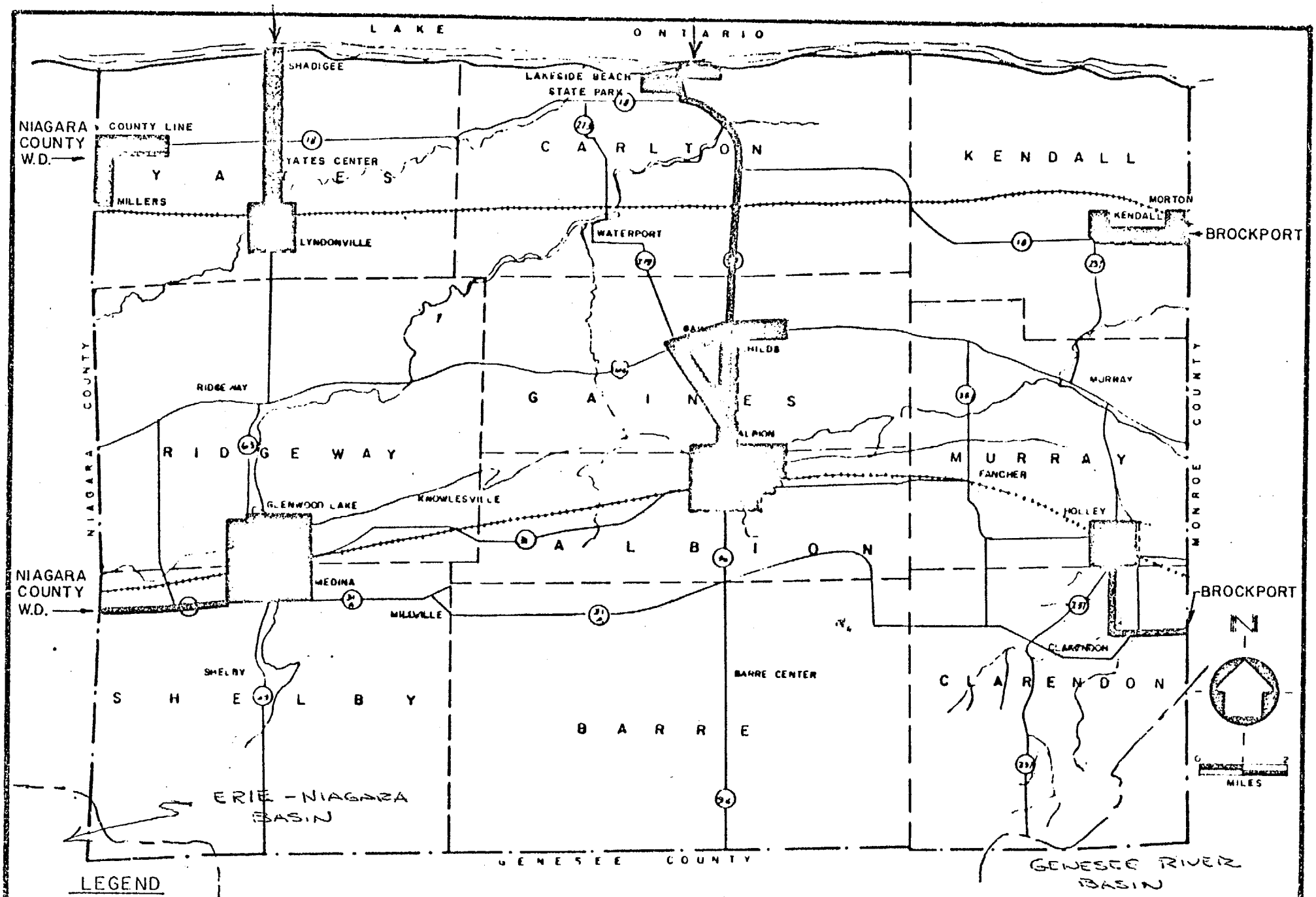
There are no aquifers of significance near the coast. The intakes for the Villages of Albion and Lyndonville are located on the lake. Watershed rules have been established for both systems and must be considered in coastal zone management.

TABLE II-1

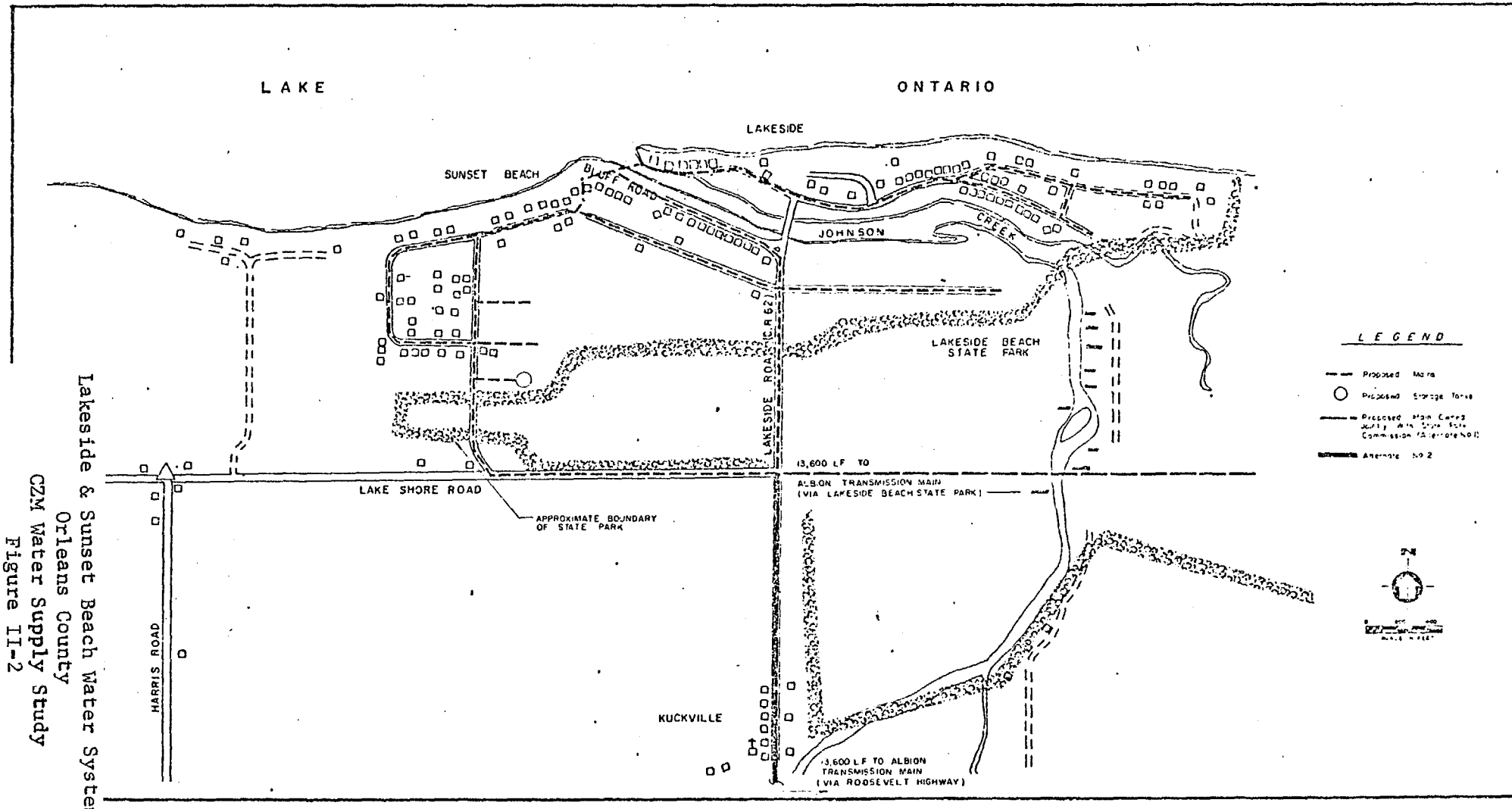
Existing Public Water Supply Systems

Orleans County

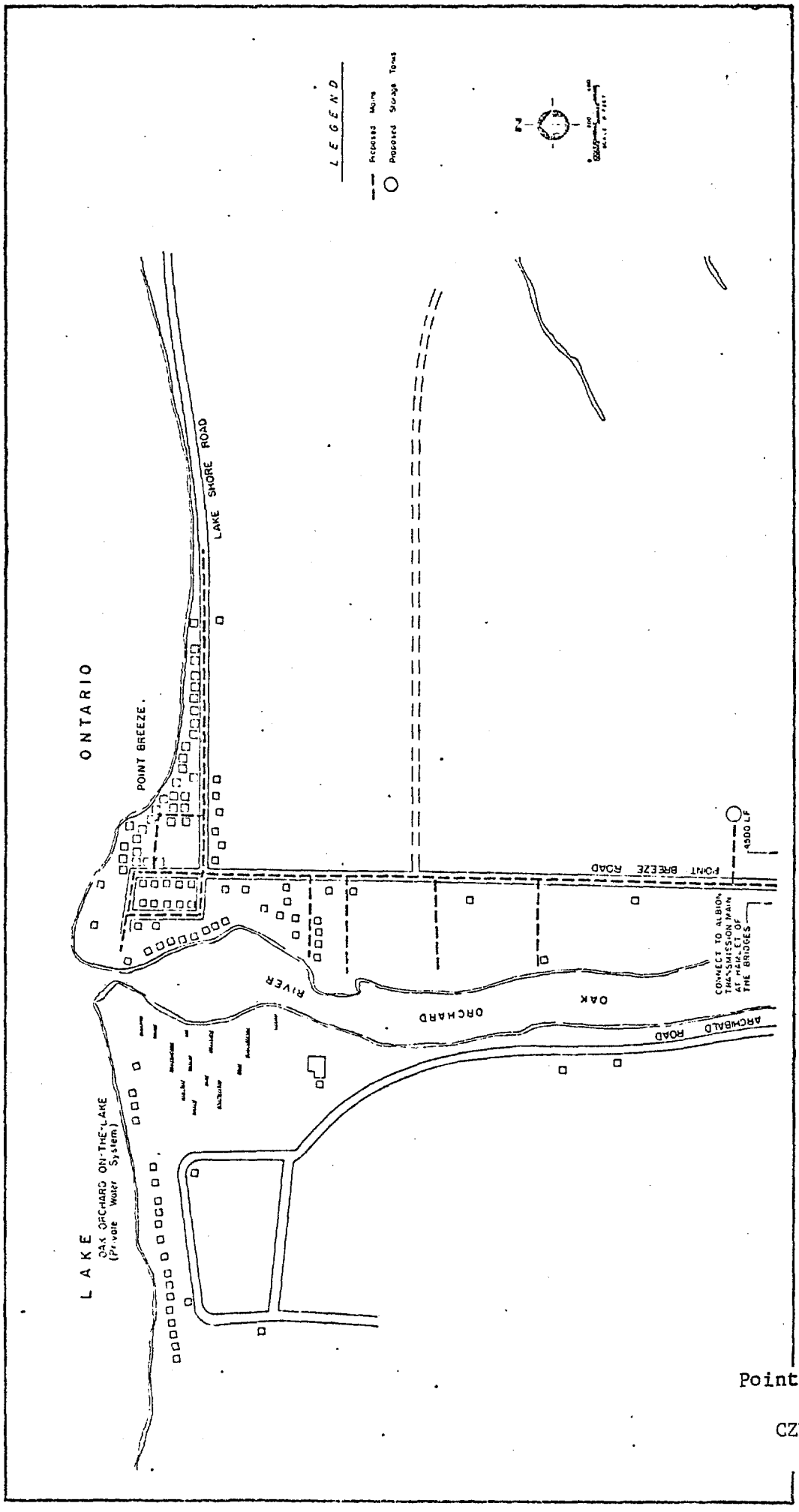
Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (mgd)	Projected Demand (mgd): 1970	Projected Demand (mgd): 1990	Projected Demand (mgd): 2020	Alternatives to Meet Future Needs
Albion	L. Ontario	2.0	1.10	2.00	3.10	Expansion of treatment plant by 1990
Lyndonville	L. Ontario	0.2	0.12	0.15	0.16	



Existing Public Water Supply Systems
Orleans County
CZM Water Supply Study
Figure II-1



Lakeside & Sunset Beach Water System
Orleans County
CZM Water Supply Study
Figure II-2



Point Breeze Water Systems
Orleans County
CZM Water Supply Study
Figure II-3

MONROE COUNTY

Monroe County is dominated by the City of Rochester. According to the 1970 census, 90% of the approximately 712,000 people living in the County resided within the City of Rochester and in the towns adjacent to the City.

The economy is heavily dependent upon the manufacture of instruments and machinery. The Eastman Kodak Corporation located in Rochester is the major employer in the county.

Latest available population projections from the Economic Development Board indicate a county growth of about ten percent to about 770,000 by 1990. Most of this growth will occur in the suburban towns adjacent to Rochester. The Town of Webster, which borders Lake Ontario east of Rochester, is expected to experience substantial growth.

The land generally slopes up from the Lake Ontario shoreline, with the highest elevations along the County's southern border. There are several small bays on the Lake Ontario coast immediately west of Rochester. Irondequoit Bay, on the east side of Rochester, is quite large, extending about five miles southerly from the Lake into the interior of the County.

A considerable portion of Monroe County is drained by the Genesee River, which runs northerly through the center of the county and empties into Lake Ontario at Rochester. There are no large lakes in the county.

Groundwater availability is highly variable throughout the county. Glacial outwash deposits in the present valley of the Genesee River and in its abandoned channels are the most productive sources in the basin. In many parts of the county, glacial till is the principal overburden and groundwater yields are low. The yields from bedrock are generally less than 20 gallons per minute. Much of the groundwater presently used for public water supply in the county is high in hardness and total dissolved solids.

Description of Public Water Supply Systems

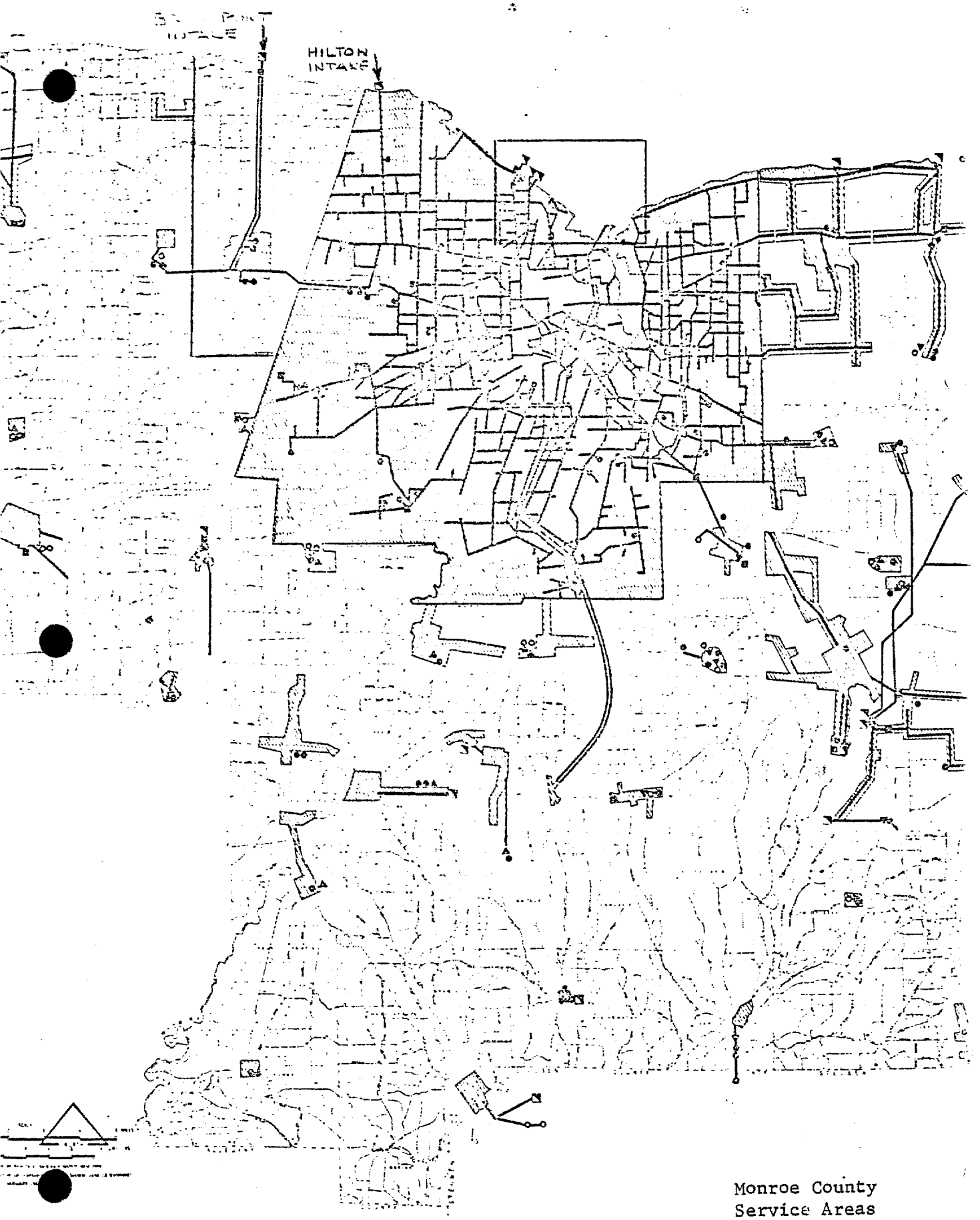
There are ten public water supply systems in Monroe County. By far, the two most important are the City of Rochester system and the Monroe County Water Authority (MCWA) system. These two systems served about 593,000 customers in 1970. The MCWA, being a county-wide entity, has a wide tax base and greater bonding authority than the village systems in the County. It is expected that the MCWA will be able to meet future needs of these smaller systems at a more economical price than they could by themselves. The MCWA is presently interconnected to seven of the other nine public water supply systems, there are public water supply systems in the County. Besides the two previously mentioned systems, there are public water supply systems in the Villages of: Brockport, Hilton, Webster, Fairport, Churchville, Pittsford, Spencerport and East Rochester. Following is a description of the Rochester, MCWA, Brockport, Hilton and Webster systems which have facilities affecting the coastal areas.

City of Rochester

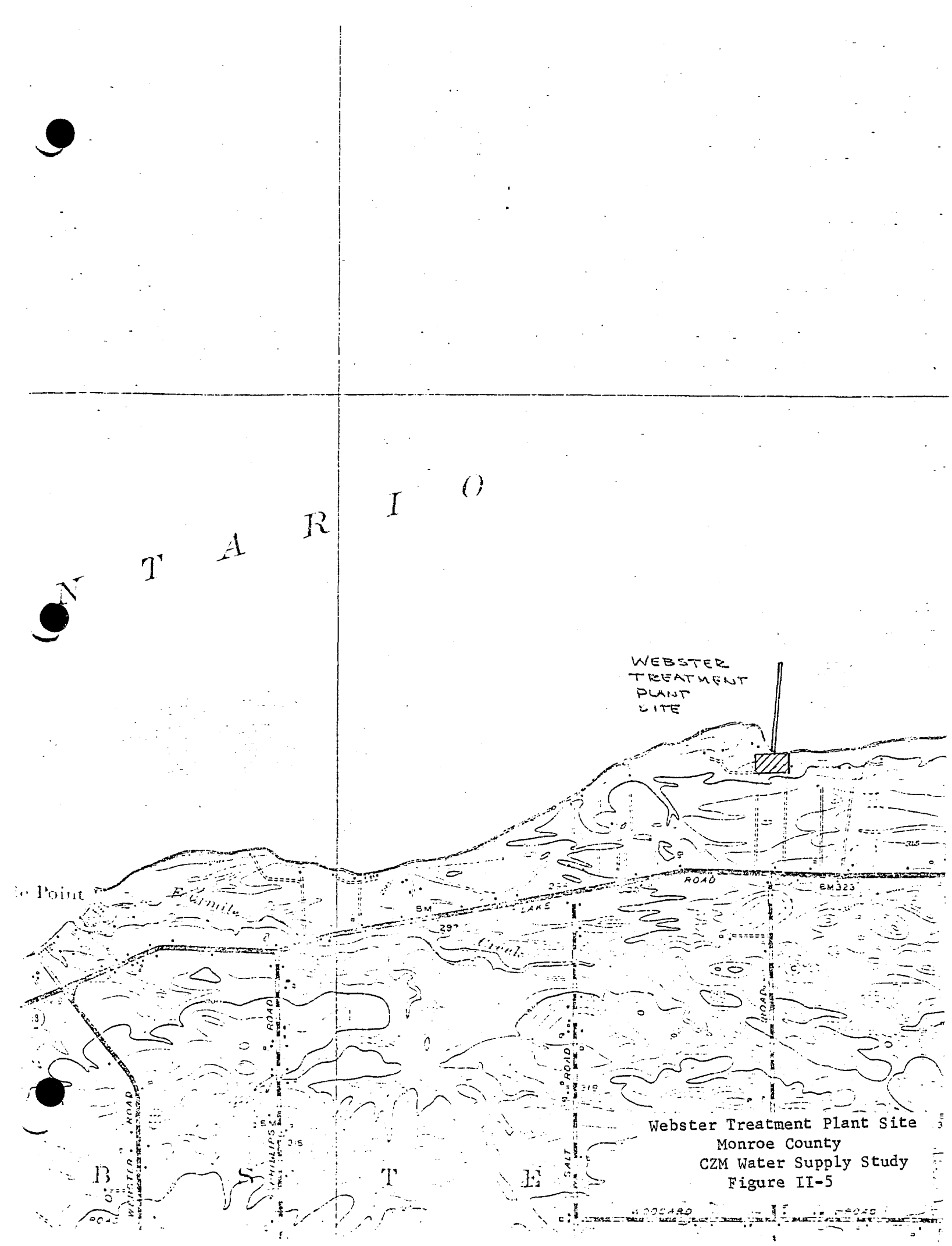
Rochester takes its raw water supply from Lake Ontario and from Hemlock and Canadice Lakes located in Livingston and Ontario counties. The Lake Ontario supply is withdrawn through an intake shared with the Monroe County Water Authority and treated at a filtration plant located adjacent to Lake Ontario (See Figure II-4). Treatment capacity is rated at 36 mgd.

The upland supply consists of Hemlock and Canadice Lakes and a system of conduits connecting by gravity flow to the City system. The lakes have an estimated safe yield of 30 mgd. The conduit system capacity is 48 mgd.

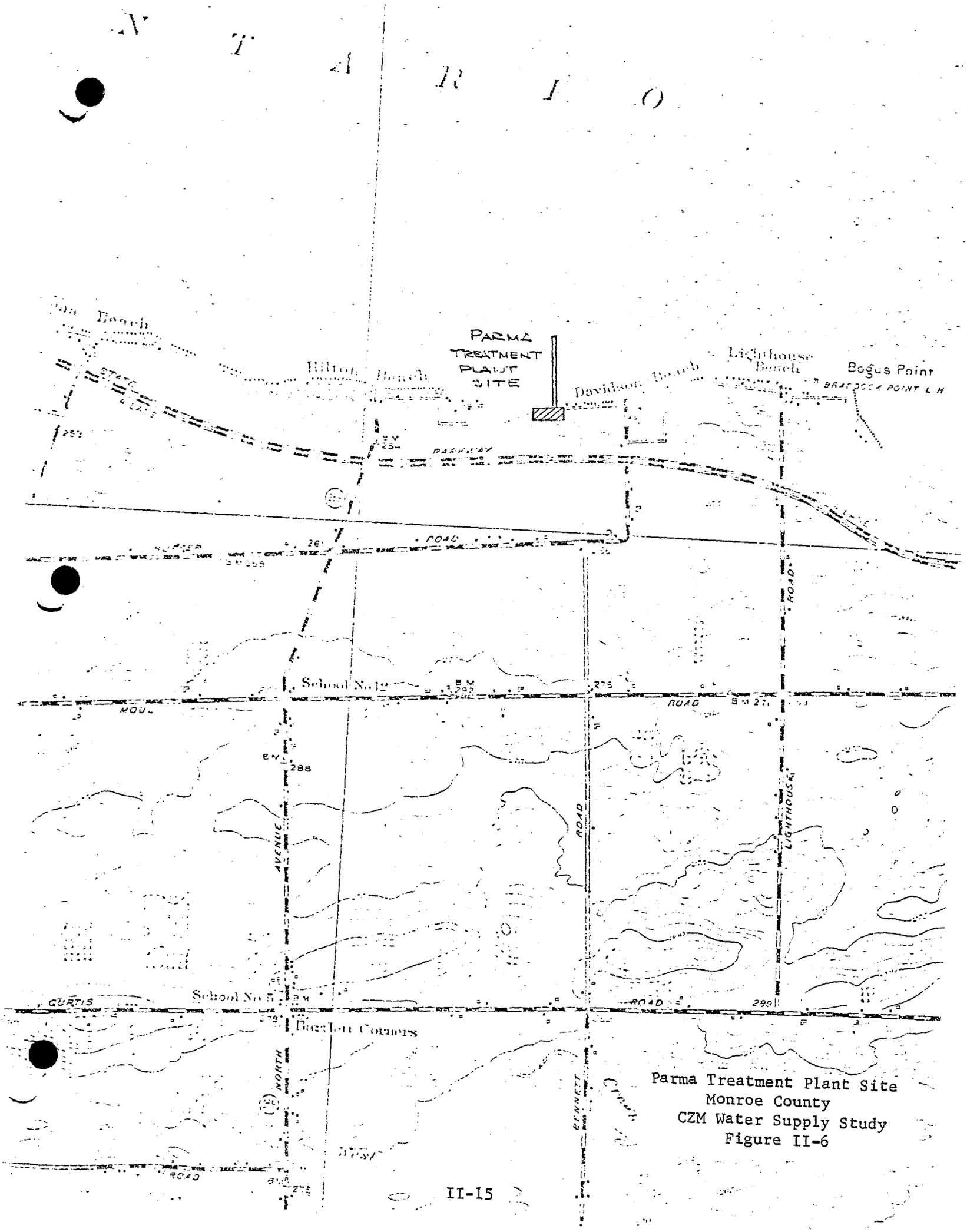
The system capacity is more than adequate to meet present needs. The Monroe County Comprehensive Water Supply Study (V-A study) recommends the consolidation of City and Monroe County Water Authority production, transmission and storage facilities under the ownership and administration of the MCWA in order to insure the most economical supply of water.



Monroe County
Service Areas
CZM Water Supply Study
Figure II-4



Webster Treatment Plant Site
Monroe County
CZM Water Supply Study
Figure II-5



Parma Treatment Plant Site
Monroe County
CZM Water Supply Study
Figure II-6

maximum daily demand. Additional water is purchased from the MCWA during periods of peak demand. Recommendations are for the Village to continue purchasing peaking water from the MCWA.

Village of Hilton

Hilton takes its raw water supply from Lake Ontario. The water is treated at the Village's 0.6 mgd treatment plant located near Hilton Beach. The plant is old and inadequate to meet maximum daily demand. The Village system is interconnected with the MCWA system. Recommendations are for the Village to phase out its existing plant and contract with the MCWA for the supply of all future requirements.

Village of Webster

Webster takes its raw water supply from twelve wells located adjacent to Irondequoit Bay in the western part of the Town of Webster. The reported safe yield of this supply is 10.5 mgd. Seven of these wells provide very poor quality water. Projections of service area demands indicate that Webster's existing supply facilities will be unable to meet maximum day demands within the next few years. The very poor quality of the water produced at several of the Village's wells suggest that they be abandoned. Recommendations are for the Village to proceed along this course and purchase supplemental water requirements from the Monroe County Water Authority.

Table II-2 summarizes the present and projected demands for the five water systems discussed above.

Self-Supplied Industrial Systems

The Eastman Kodak Corps. is a major industrial water user. Most of Kodak's processing water is self supplied. Kodak withdrew an average of 29 mgd from Lake Ontario in 1975. The location of Kodak's water supply intake in the Town of Greece is shown on Figure II-7. The Xerox Corporation has a new facility in the Town of Webster and is expected to become a major water user in the future. The exact location of this facility and the source of its water has not yet been determined. Rochester Gas and Electric Co. also has an electric power generating facility in the Town of Greece which extracts cooling water from Lake Ontario. Nuclear and conventional power facilities will be investigated under a separate task.

Boundary Line Determinations

From a water supply point of view, the only necessary consideration would be to protect the water supply intakes along Lake Ontario. Locations of these intakes are shown on Figure II-4. A logical boundary line appears to be the roads paralleling the shoreline such as Lake Road to the East of Rochester and the Lake Ontario Parkway to the West of Rochester.

Areas for Protection

The areas around municipal and industrial water supply intakes from Lake Ontario should be protected. Watershed rules have been enacted for: Rochester, MCWS (Shoremont facility) and Hilton. Additionally, if the MCWA expects to construct treatment plants at the Parma and Webster sites, as recommended in the Comprehensive Water Supply Study, these areas will require protection. The site of the proposed Webster plant, shown on Figure II-5, is now owned by the MCWA. The Parma site, shown on Figure II-6 would have to be purchased.

Irondequoit Bay is an important body of water from a recreation and geologic point. The Bay has pollution problems caused by wastewater and salt from winter road maintenance. The shoreline of the Bay should be included in the coastal zone management area.

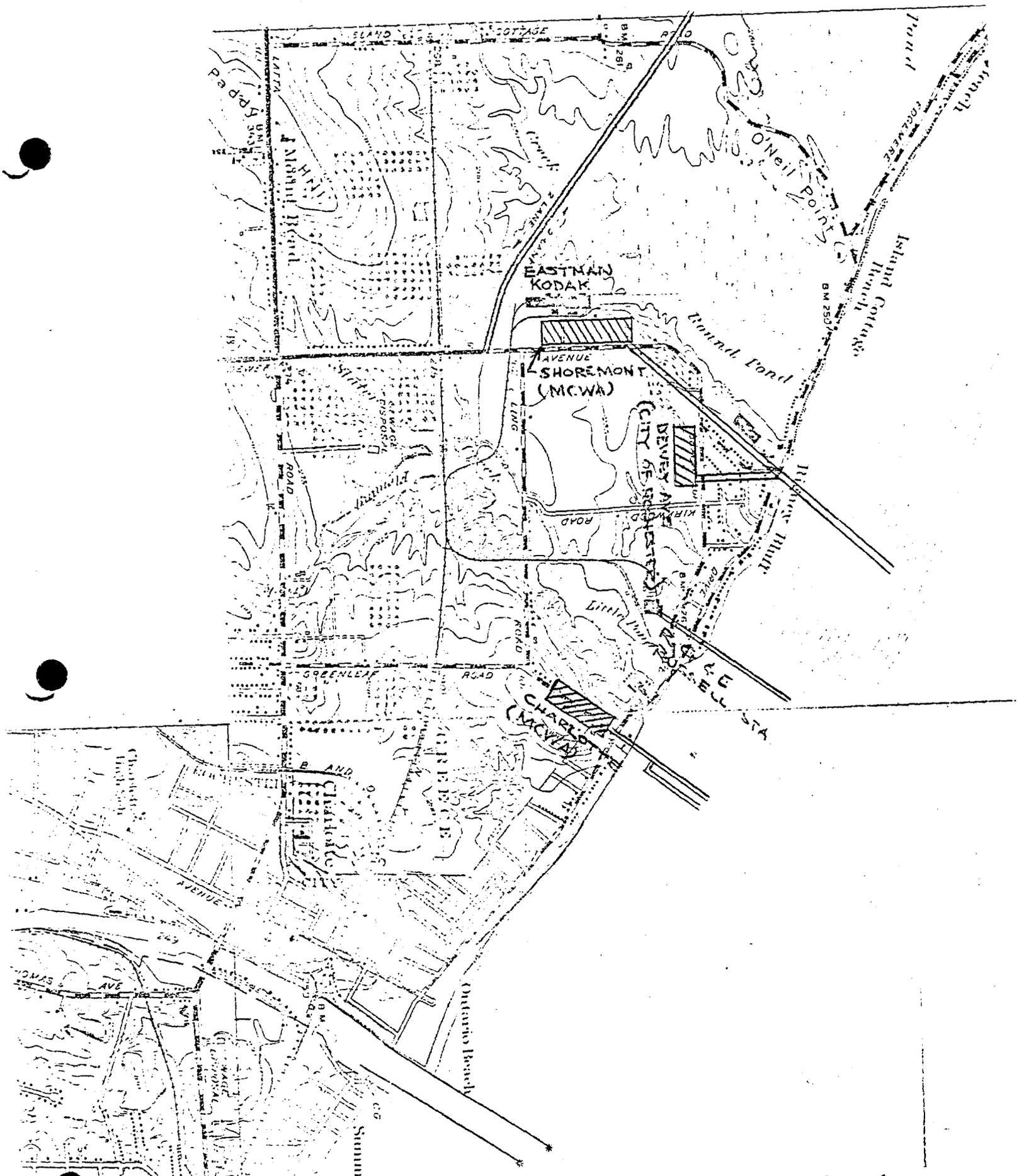
The well field for the Village of Webster is located adjacent to Irondequoit Bay . Watershed rules have been enacted. The well field should be included in any area of management.

TABLE II-2

Existing Public Water Supply Systems

Monroe County

Water System	Existing Sources & Capacity		Projected Demand (mgd)			Alternatives to Meet Future Needs
Water System	Sources	System Capacity (mgd)	1970	1990	2020	
Rochester	Lake Ontario	36	52.85	57.0	62.5	Purchase water from MCWA
"	Hemlock and Canadice Lakes	30				
Monroe Co. Water Authority	Lake Ontario	87	35.34	89	160	Additional withdrawals from Lake Ontario
Brockport	Lake Ontario	5	3.57	8.60	16.80	Purchase water from MCWA
Hilton	Lake Ontario	0.6	0.34	0.64	0.91	Purchase water from MCWA
Webster	wells	10.5	5.16	9.49	14.50	Purchase water from MCWA



Location of Intakes
Town of Greece
Monroe County
CZM Water Supply Study
Figure II-7

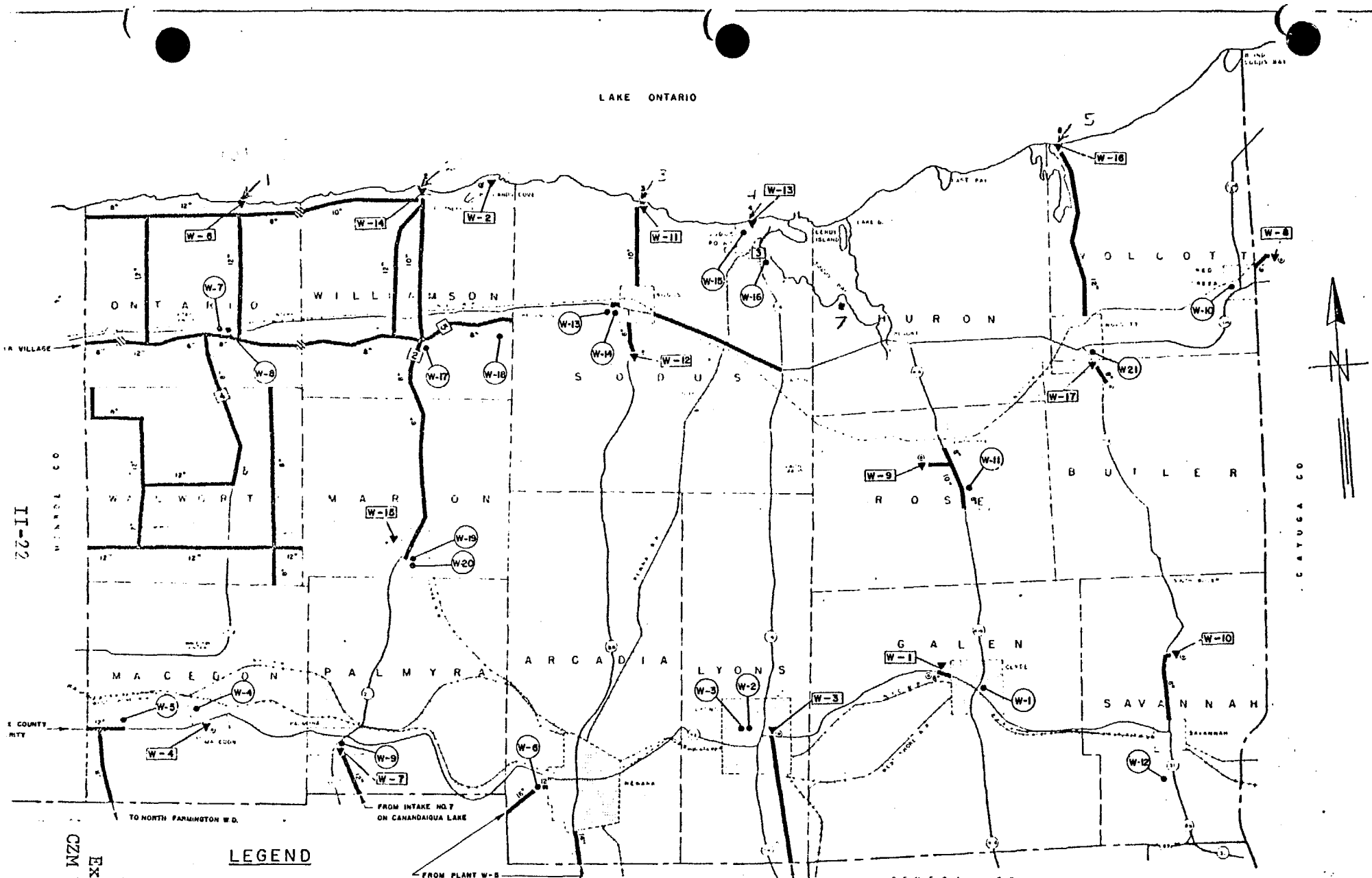
WAYNE COUNTY

Wayne County is mainly a rural-agricultural area. The major centers of population, Newark, Lyons, Palmyra and Clyde, are located in the southern half of the county. More than one-half of the land in the county is devoted to agricultural interests. Dairy and fruit farms are most numerous. Of the counties in New York State, Wayne is first in land in orchards and vineyards, second in the value of all farm products sold, third in acres of vegetables harvested for sale and fifth in farms with more than 400 chickens. Rainfall total and distribution is generally adequate so that very little of the farm acreage is irrigated.

A large food processing industry has established itself in Wayne County based on the large local farm output. These plants require large quantities of water for washing farm produce and packaging. Most of the water required by this industry is used in the fall months.

Orchards extend quite close to the Lake Ontario shoreline much of the distance between Sodus Bay and the Monroe County line. To the east of Sodus Bay, the shoreline becomes increasingly steep, with several bluffs noted on the topographic maps. From the shoreline the lake plain rises gradually to the south. The northern half of the county is drained by several small streams which empty directly into Lake Ontario. The coastline is fairly regular in the western half of the county. The eastern half is characterized by several bays and marshes which are typically separated from the Lake by a barrier beach.

There is a sizeable summer resident population along the coastline. The estimated 1966 population was 9,000. This is projected to grow to 13,000 in 1990 and 19,000 in 2020. Table II-3 shows projected growth for resort areas along the coastline.



1-5. EXISTING WATER SUPPLY INTAKES

6. GROUNDWATER SOURCE FOR [illegible]

7. GROUNDWATER SOURCE FOR [illegible]

SHAKER TRACT UTILITIES, INC

Wayne County
Existing Facilities
CZM Water Supply Study
Figure II-8

Groundwater is generally available in the county for individual well development although high hardness and iron content are common.

Description of Public Water Supply Systems

Wayne County has 22 individual systems serving roughly 60 percent of the County's 74,000 inhabitants. Of these, five use Lake Ontario as a source of supply. Most of the smaller systems utilize groundwater.

There are eight existing systems with either service areas or source of supply within the coastal area. A brief description of each follows.

Holland Cove

This is a resort village located on the coastline in the Town of Williamson. Summer resident population is about 230. The water supply system operates in the summer only. Source of supply is groundwater. Any additional source needs likely will be obtained from groundwater development.

Ontario Water District (including Walworth W.D.)

The Ontario Water District supplies all water districts in the Town of Ontario, except the West Ontario Water District, and all water districts in the Town of Walworth (see Figure II-8). Source of water is Lake Ontario.

Village of Sodus (including Sodus W.D.)

Approximately 4,400 people are served by this system. Lake Ontario is the main source of supply, with wells as an emergency supply.

Village of Sodus Point

The Sodus Point system served about 1,300 people in 1966. The Village supply is taken from Lake Ontario.

West Ontario Water District

The West Ontario Water District buys its water from the Village of Webster, Monroe County. The system served 380 people in 1966.

Williamson Town Water District

The Williamson Town W.D. includes all water districts in the Town (Williamson, East Williamson, Pultneyville, Ridge Chapel and West Ridge Water Districts) and the Marion Town Water District. Lake Ontario is the source of supply.

Village of Wolcott

The Village of Wolcott has a treatment plant on Lake Ontario. The system served 1,640 people in 1966.

Shaker Tract Utilities, Inc.

This is a private water supply system serving the Shaker Heights subdivision located on the west side of Sodus Bay in the Town of Huron (see Figure II-9). Source of supply is groundwater. The system supplied an average 11,000 gallons per day to 175 people in 1974.

The Report on Comprehensive Public Water Supply Study for Wayne County recommends an intermunicipal development plan for much of the county, including all of the coastal area. The plan recommends interconnection of existing systems and development of additional capacity in order to permit expansion of service areas and to absorb growth in demand. Principal features include phased expansion of the Town of Williamson treatment plant and phase-out of plants of the Ontario Water District and Villages of Sodus, Sodus Point and Wolcott. Project phasing is shown on Figure II-10. The system would be administered by a County Water District.

Table II-4 summarizes available information on present and projected demands on the above seven systems

Self-Supplied Industrial Water Supplies

The field interviews, which are discussed later, produced information on one self supplied industrial water user in Wayne County. Rochester Gas and Electric Corporation's Ginna Station is located in the Town of Ontario and take cooling water from Lake Ontario.

Boundary Line Determination

The determination of boundary line location in Wayne County should follow careful study of the shoreline. In some places, bluffs border the coastline. In other places, bays and wetlands cut deep into the interior of the County. The areas recommended for ptoection should be included in the management area, if possible.

Areas for Protection

There are no important aquifers near the coastline except for the groundwater sources of the Holland Cove and Shaker Tract Utilities, Inc., water supplies. These aquifers should be protected. The five withdrawal points and the accompanying filtration plants should be included in the management area.

TABLE II-3

Summer Residents - Wayne County (1)

Location	1966	1990	2020
Lake Ontario			
Ontario Town			
Bear Creek	370	520	780
Remainder of Town	370	520	780
Williamson Town			
Hollands Cove	230	320	480
Remainder of Town	700	980	1,500
Sodus Town Western Shoreline	330	460	690
Camp Beechwood	200	280	420
Sodus Point Village	1,800	2,500	3,800
Sodus Bay			
Lake Bluff	420	590	880
LeRoy Island	500	700	1,100
Remainder of Sodus Bay (2)	1,580	2,200	3,300
East Bay	560	780	1,200
Port Bay	1,750	2,400	3,700
Blind Sodus Bay	280	390	590
Total	9,090	13,000	19,000

(1) Average number of residents in addition to year-round population at recreational areas on weekends during the summer

(2) Centered around the hamlet of Resort

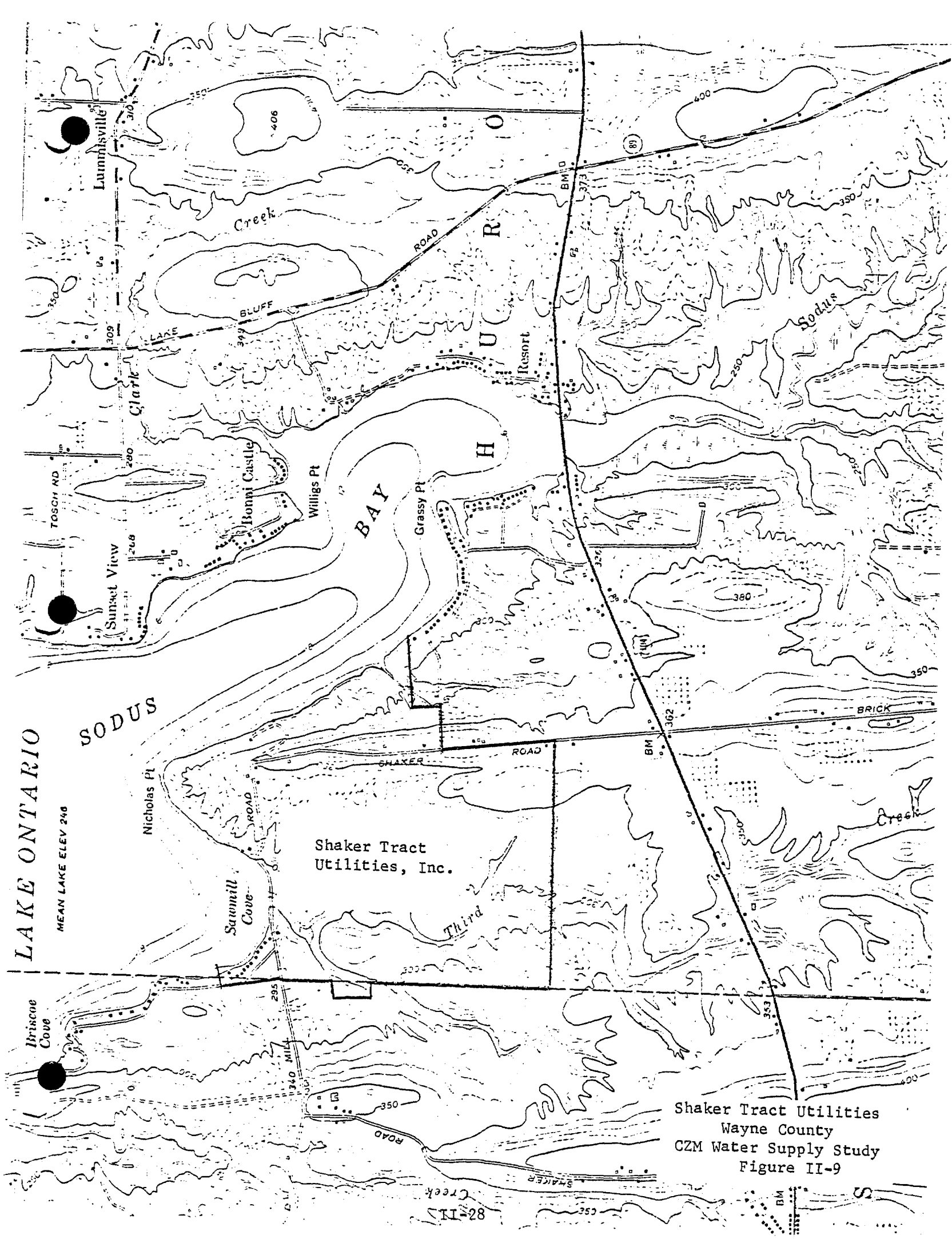
Source: Wayne County Comprehensive Water Supply Study

TABLE II-4

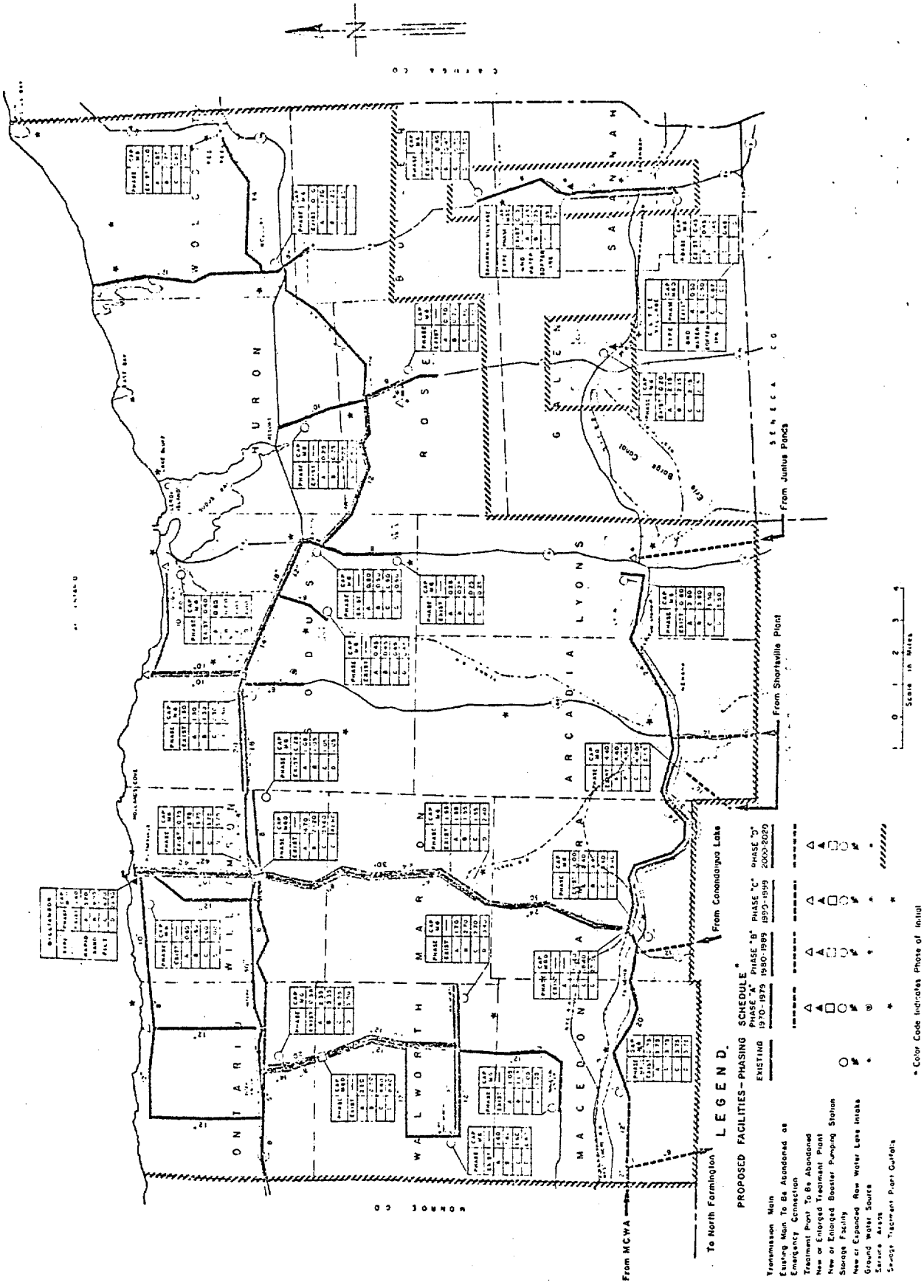
Existing Public Water Supply Systems

Wayne County

Water System	Existing Sources & Capacity: Sources	System Capacity (mgd)	Projected Demand (mgd): 1966	1990	2020	Alternatives to Meet Future Needs
Holland Cove	Groundwater	0.03	0.01	0.01	0.03	Increase groundwater withdrawals
Ontario W.D.	Lake Ontario	1.53	0.32	N.A.	N.A.	Either interconnection of systems, as outlined in the Wayne County Comprehensive Water Supply Study, or continue present Lake Ontario withdrawals
Sodus (V)	Lake Ontario & wells	1.64	0.50	N.A.	N.A.	
Sodus Point(V)	Lake Ontario	0.75	0.12	N.A.	N.A.	
Williamson W.D.	Lake Ontario	2.50	1.10	N.A.	N.A.	
Wolcott (V)	Lake Ontario & springs	1.00	0.30	N.A.	N.A.	
Shaker Tract Utilities, Inc.	Groundwater	0.13	0.011	N.A.	N.A.	
West Ontario W.D.	Webster, Monroe Co.	-	N.A.	N.A.	N.A.	Continue to meet needs by purchasing water from Village of Webster



Shaker Tract Utilities
Wayne County
CZM Water Supply Study
Figure II-9



Recommended Project Phasing
Wayne County
CZM Water Supply Study
Figure II-10

CAYUGA COUNTY

There is only about eight miles of Lake Ontario shoreline in Cayuga County. The major feature is Little Sodus Bay located near the Wayne County line. Major stream tributaries, which enter Lake Ontario along the coastline, are Sterling Creek and Ninemile Creek. Fair Haven Beach State Park is located immediately east of Little Sodus Bay and occupies a little more than one mile of coastline. The coastline consists of a series of drumlins separated by marshes which extend inland along streams. Barrier beaches generally front the marshes.

Description of Public Water Supply Systems

The Village of Fair Haven, on Little Sodus Bay, is the only community water supply system presently affecting the coastal area. The Onondaga County Comprehensive Water Supply Study recommends that the Onondaga County Water District construct an intake and treatment plant at West Nine Mile Point sometime around 2020 to meet anticipated demand (See Figure II-11).

Village of Fair Haven

The source of water supply is well field located east of the Village near a tributary of Sterling Creek. Fair Haven is a resort community with a large influx of summer visitors. The largest user of the Village system is the Fair Haven Beach State Park. The service area, shown on Figure II-12, includes the Little Sodus Bay shoreline and the State Park. The present source should be adequate through 1990. Additional groundwater development would likely be the last expensive means of increasing supply.

Onondaga County Water District (OCWD)

See Oswego County for a system description.

Self-Supplied Industrial Water Systems

There are no known self supplied industrial water supply system. However, the field interviews with Rochester Gas and Electric Corporation shows that they

are considering the location of a plant (Sterling No. 1) in the area.

Boundary Line Determination

There are neither public water supply sources nor aquifers near enough to the coastline to influence boundary line determinations.

Areas for Protection

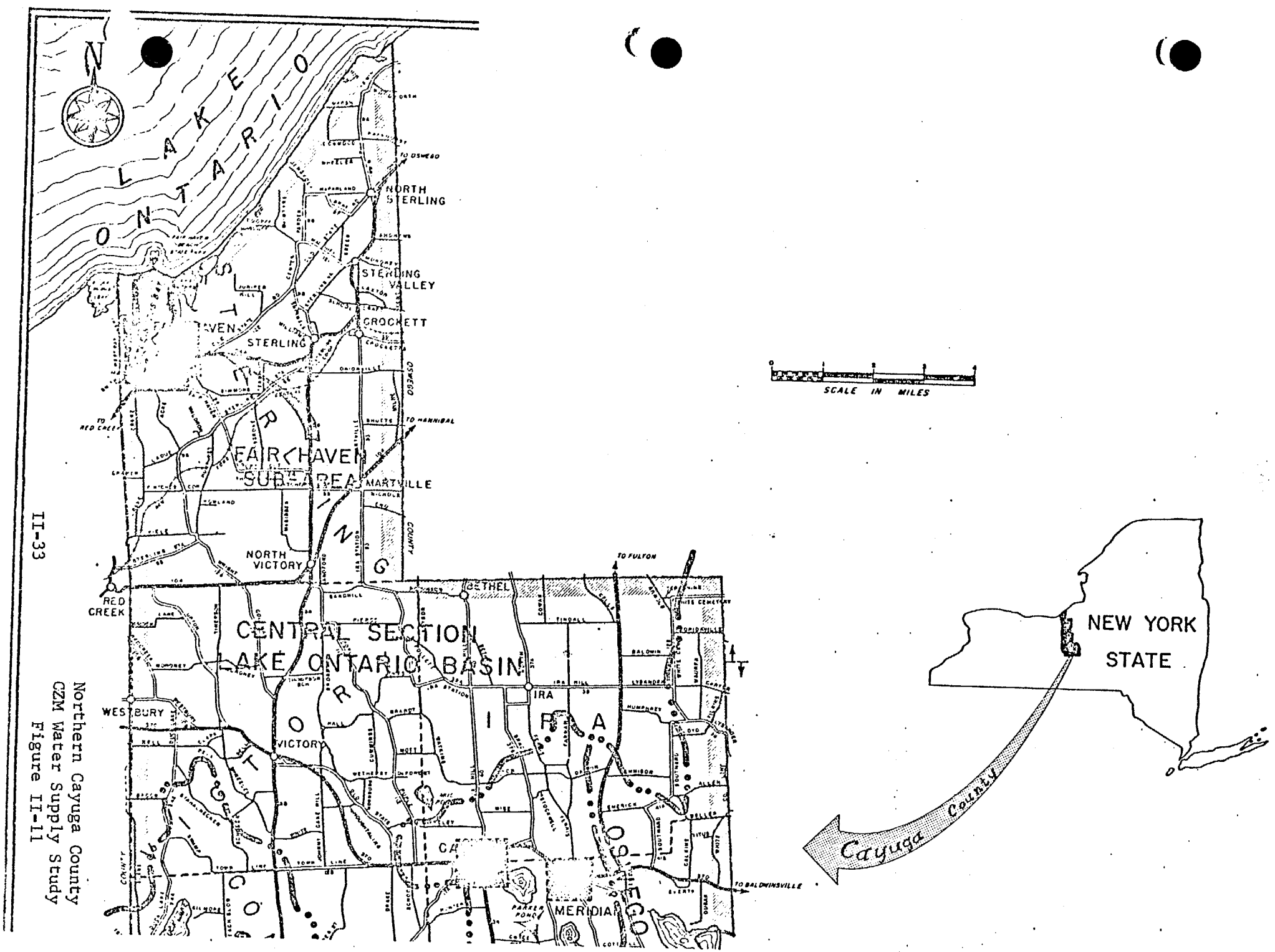
Fair Haven's well field is located 3,700 feet distant and 20 feet higher than the coastline; too far away to warrant consideration. The Onondaga County Water District proposed intake at the West Nine Mile Point site could need protection.

TABLE II-5

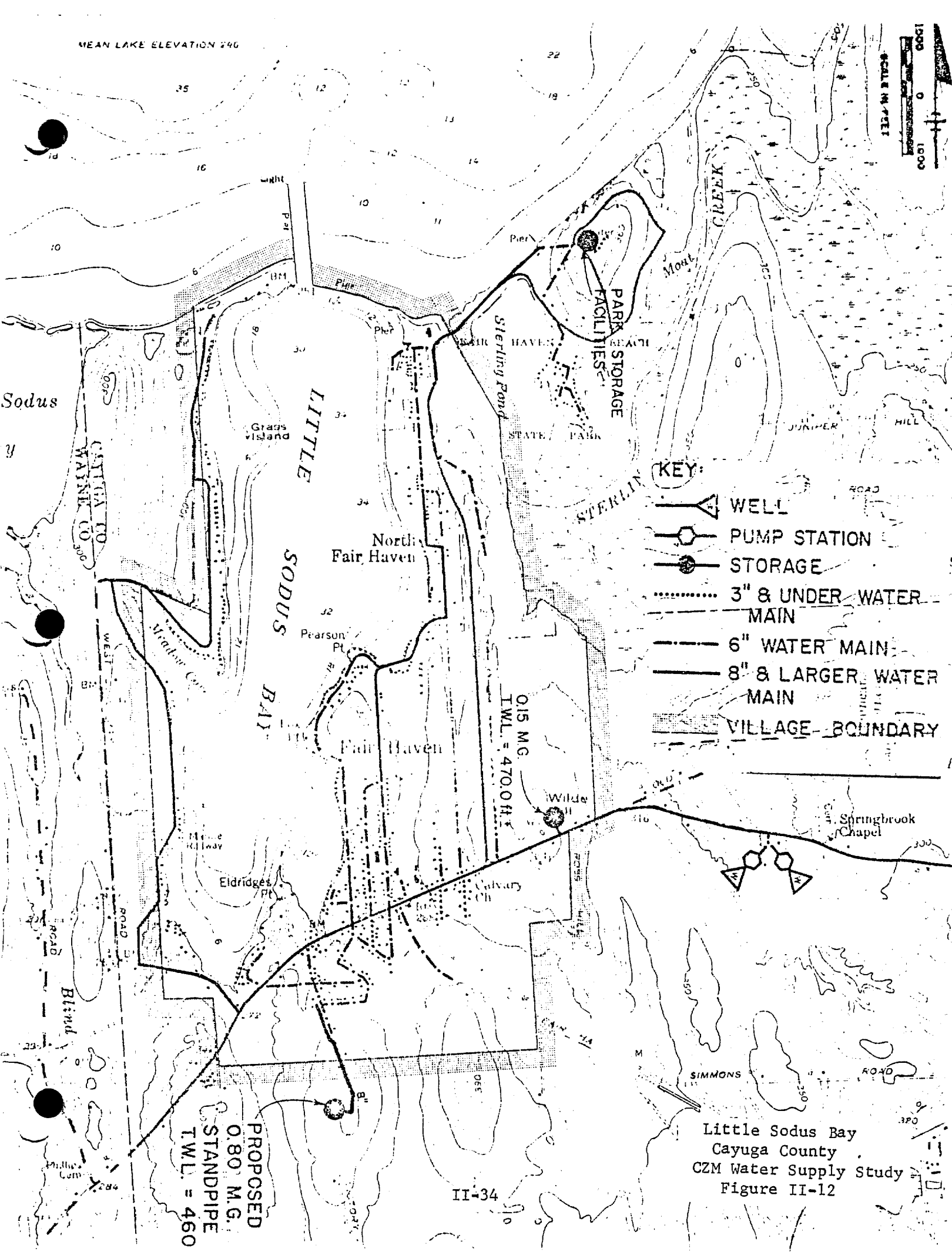
Existing Public Water Supply Systems

Cayuga County

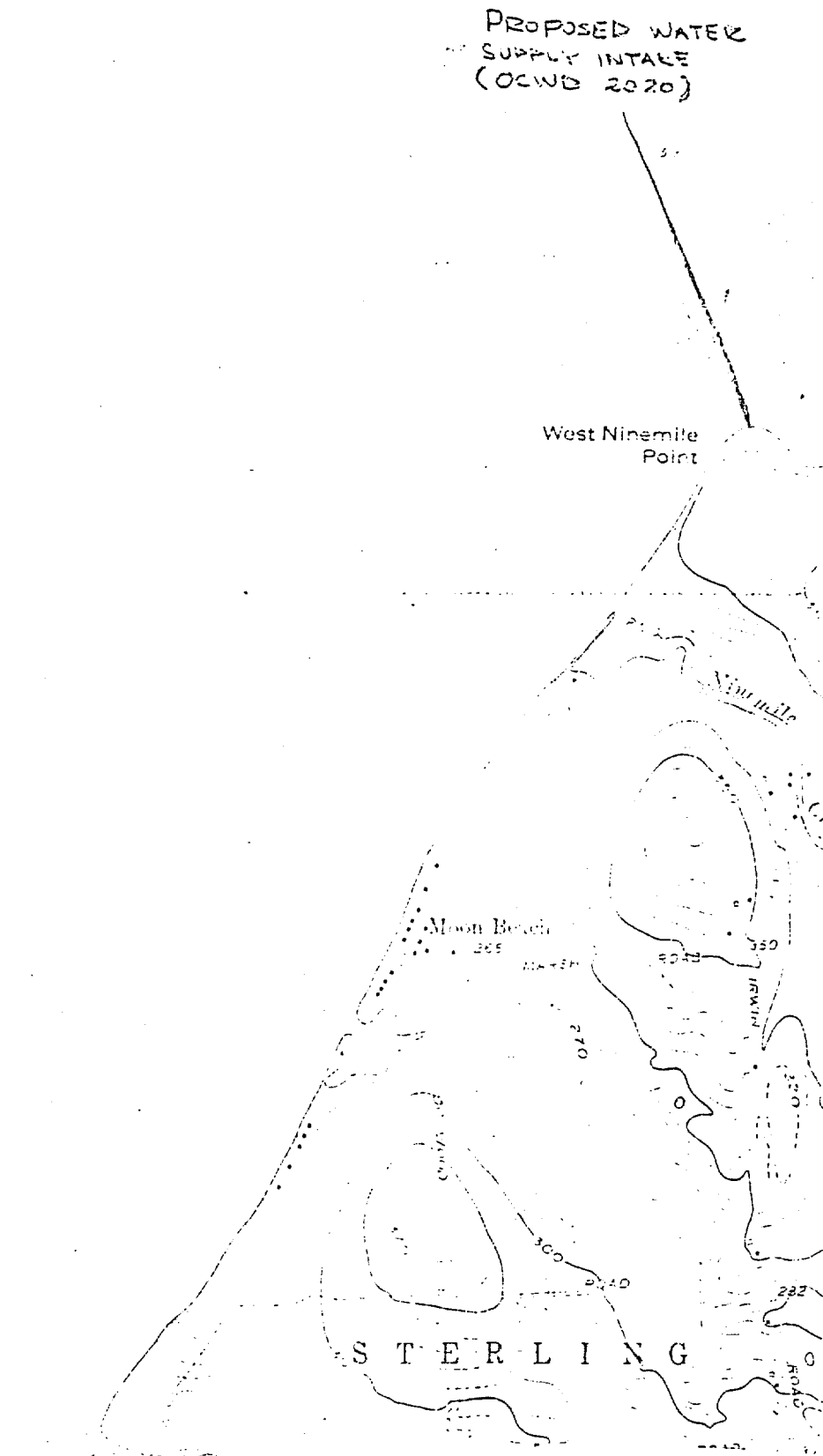
Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (mgd)	Projected Demand (mgd): 1970	Projected Demand (mgd): 1990	Projected Demand (mgd): 2020	Alternatives to Meet Future Needs
Fair Haven	Groundwater	0.505	0.075	0.140	0.290	Additional ground water



Northern Cayuga County
CZM Water Supply Study
Figure II-11



Little Sodus Bay
Cayuga County
CZM Water Supply Study
Figure II-12



Proposed Ninemile Creek Intake Site
Cayuga County
CZM Water Supply Study
Figure II-13

OSWEGO COUNTY

The center of population and commercial activity in Oswego County has traditionally been the City of Oswego. However, the Syracuse suburban area is having increasing influence on the population trends and on employment in the county. The combination of the movement to suburbia and improved road access from Syracuse is causing a substantial population growth on the corridor between Syracuse and Oswego. Population projections indicate a county growth rate substantially higher than the State average during the next 25 years. In addition to this, new industries have settled in the county, making the employment outlook, over the long term, bright.

The only urbanized area of the Lake Ontario coastline is in the City of Oswego. Oswego, at one time, was a major Great Lakes port. Although the amount of cargo tonnage handled has decreased substantially in the last hundred years, the port continues to generate a considerable amount of commercial and industrial activity along the adjacent coastline.

The Lake Ontario coastline in Oswego County has a variable topography. West of the City of Oswego, it consists of a series of drumlins trending in a general north-south direction, separated by marshes that extend several miles inland along small creeks. The drumlins range up to 150 feet above lake level and one-quarter to one-half mile wide at their base.

For about 13 miles east of the Oswego River, the shore bluffs are from 5 to 25 feet high. From there to the Salmon River the shore contains occasional reaches of high ground separated by marsh areas that are fronted by barrier beaches.

The remaining Oswego County shoreline north of the Salmon River is generally a barrier beach and sand dunes up to 45 feet high, separating either marsh areas or open ponds from the lake.

The major stream system in the county is the Oswego River, which enters Lake Ontario at the City of Oswego. Other streams draining portions of the County are the Salmon River, Little Salmon River, Little Sandy Creek and Grindstone Creek.

Selkirk Shores State Park is located on the Lake Ontario coastline in the Town of Richland, between the outlets of the Salmon River and Grindstone Creek. The Office of Parks and Recreation proposes expansion of the park in its Statewide Comprehensive Recreation Plan. Harbors of Refuge are also proposed by OPR for Mexico Point and Port Ontario.

Description of Public Water Supply Systems

There are two public water supply systems which affect the Lake Ontario coastline in Oswego County. The existing municipal water supply facilities are shown in Figure II-14.

City of Oswego

The City takes all of its public water supply from Lake Ontario from an intake located just west of the Oswego River. The intake structure is at the end of an eight-foot diameter tunnel which extends 6,250 feet off shore in about 54 feet of water. The intake is shared with the Onondaga County Water District, which is allowed to withdraw up to 62.5 mgd. The water receives only chlorination and fluoridation before use. The City is under orders, issued by the Water Resources Commission, to filter its water supply. Pumping capacity is expected to be sufficient to meet needs through 2020.

The City system also serves part of the adjacent towns of Oswego, Minetto, Scriba and Volney. The present service area and the likely 1990 and 2020 areas served are shown on Figure II-15. Industries served include the Alco Aluminum Co. and the Niagara Mohawk Nine Mile Point facility in the Town of Scriba and the Hammermill Paper Company in the City of Oswego.

Onondaga County Water District (OCWD)

OCWD, which is administered by the Metropolitan Water Board, takes its water supply from Lake Ontario. The District has a contract with the City of Oswego to take up to 62.5 mgd from Oswego's Lake intake. The water is pumped to a filtration plant located south of Oswego and then transmitted to Onondaga County. At present, OCWD has two customers, the Onondaga County Water Authority and the City of Syracuse. However, other municipalities in both Onondaga and Oswego Counties are expected to purchase water from this system in the future.

The Onondaga County Comprehensive Public Water Supply Study has recommended an expansion plan to meet an expected large growth in demand. The study predicts that the Onondaga County service area demand in 1990 and 2020 will be 139 mgd and 223 mgd, respectively. The study recommends that Lake Ontario supply 73 mgd in 1990 and 155 mgd in 2020.

It is recommended that the existing pumping facilities at the City of Oswego intake be expanded to the 62.5 mgd allowable capacity, that a new intake be built on Lake Ontario at Burt Point which is located about 1.5 miles west of the existing intakes, and that the treatment plant located south of Oswego be expanded. These facilities are recommended for construction prior to 1980. For 1990 further expansion of pumping, treatment and transmission facilities are recommended.

For 2020 the construction of a third Lake Ontario intake, located at West Nine Mile Point in Cayuga County, is recommended. A water treatment plant would also be constructed at the site. The future expansion plans are shown in Figure II-16.

The service areas and sources of supply of other water supply systems in the county are all located more than one mile from the coastline. None of these systems are expected to seek a source of supply within one mile of the coastline in the future.

Self Supplied Industrial Water Systems

There are two electric power generating plants on the coastline in Oswego County, both operated by the Niagara Mohawk Power Corps. The Oswego station, located in the City of Oswego, uses fossil fuels. The Nine Mile Point Station in the Town of Scriba, is nuclear powered. Lake Ontario water is used for cooling:

Boundary Line Determination

The existing City of Oswego and Onondaga County Water District pumping stations, located on the coastline at Oswego, should be included in the coastal zone management area. Since the Onondaga County Water District plans to construct pumping and treatment facilities at Burt Point, Oswego County, and West Nine Mile Point, Cayuga County, these areas should also be included in any management area.

Areas for Protection

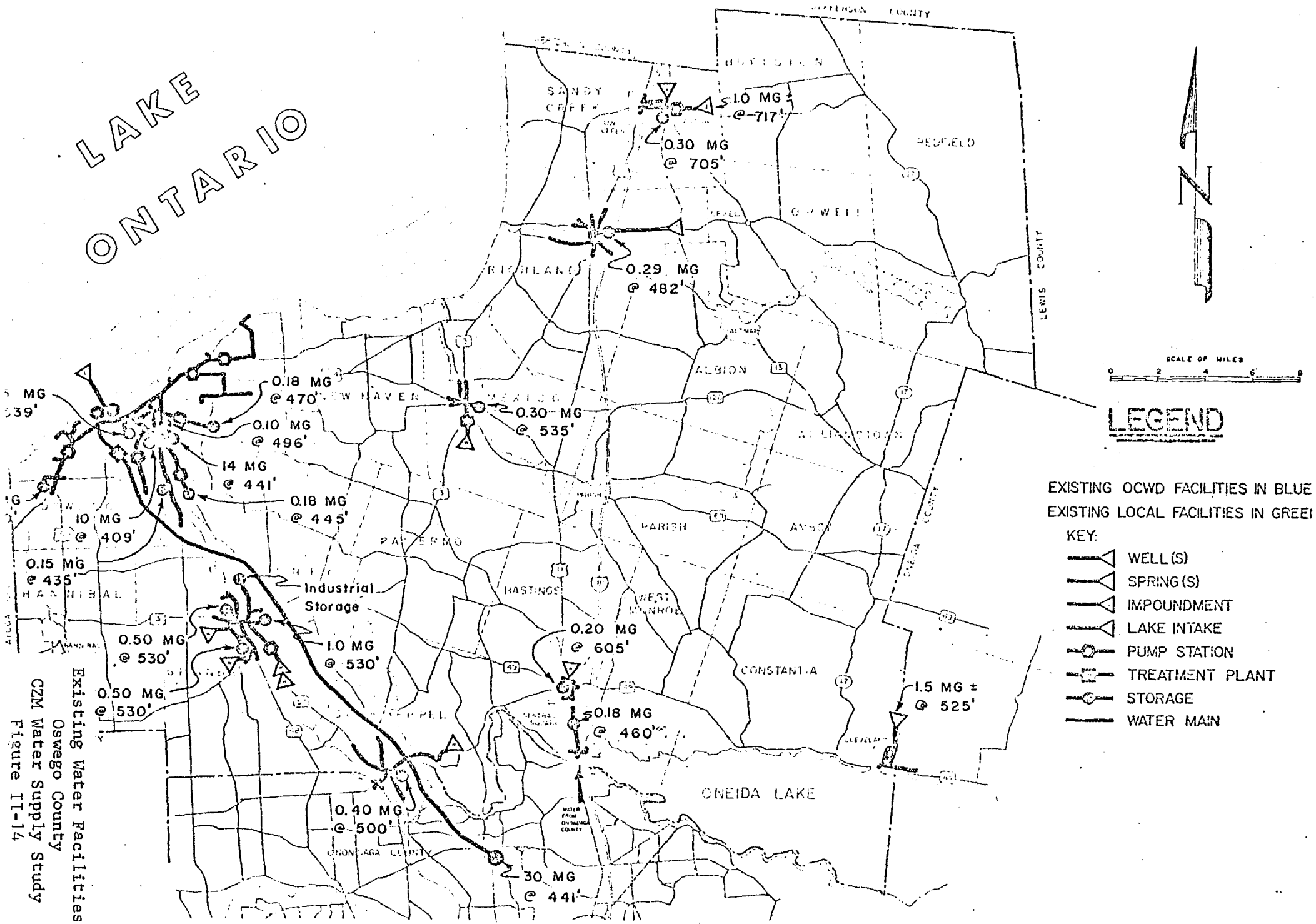
There are no important aquifers within the coastal area which require special protection. No new water supply systems are expected to be established within a mile of the coastline in the next 45 years. It is expected that the City of Oswego system will serve more of the coastal area as time passes. The only water supply system expected to seek new source supply in the coastal area is the Onondaga County Water District.

Since the existing City of Oswego intake is located far out into Lake Ontario approximately 6,250 feet, no watershed rules have been established. The location of its pumping station and the adjacent OCWD pumping station should be considered in the course of establishing land use regulations for the adjacent area.

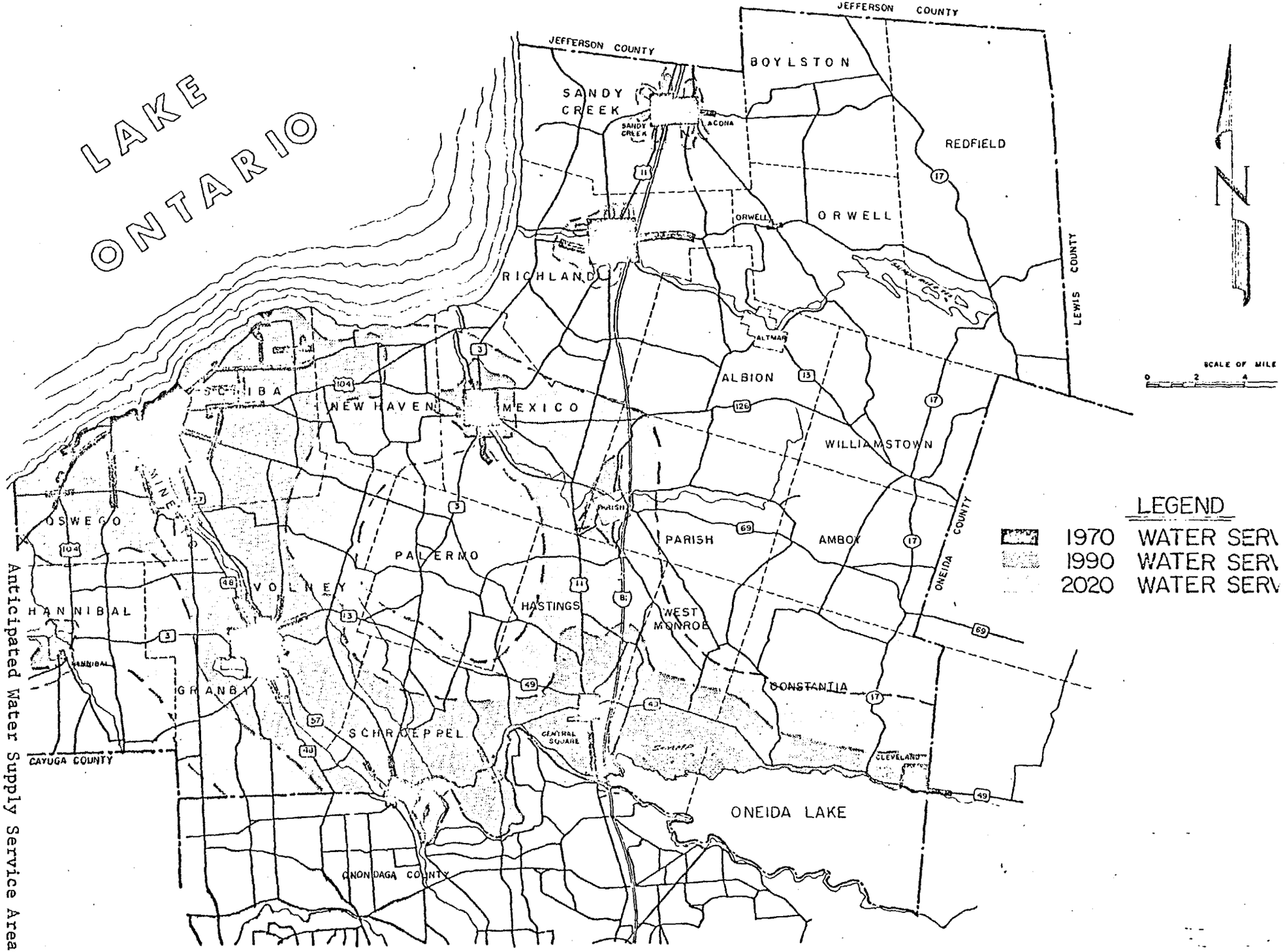
TABLE II-6

EXISTING PUBLIC WATER SUPPLY SYSTEMS
COASTAL ZONE AREA
OSWEGO COUNTY

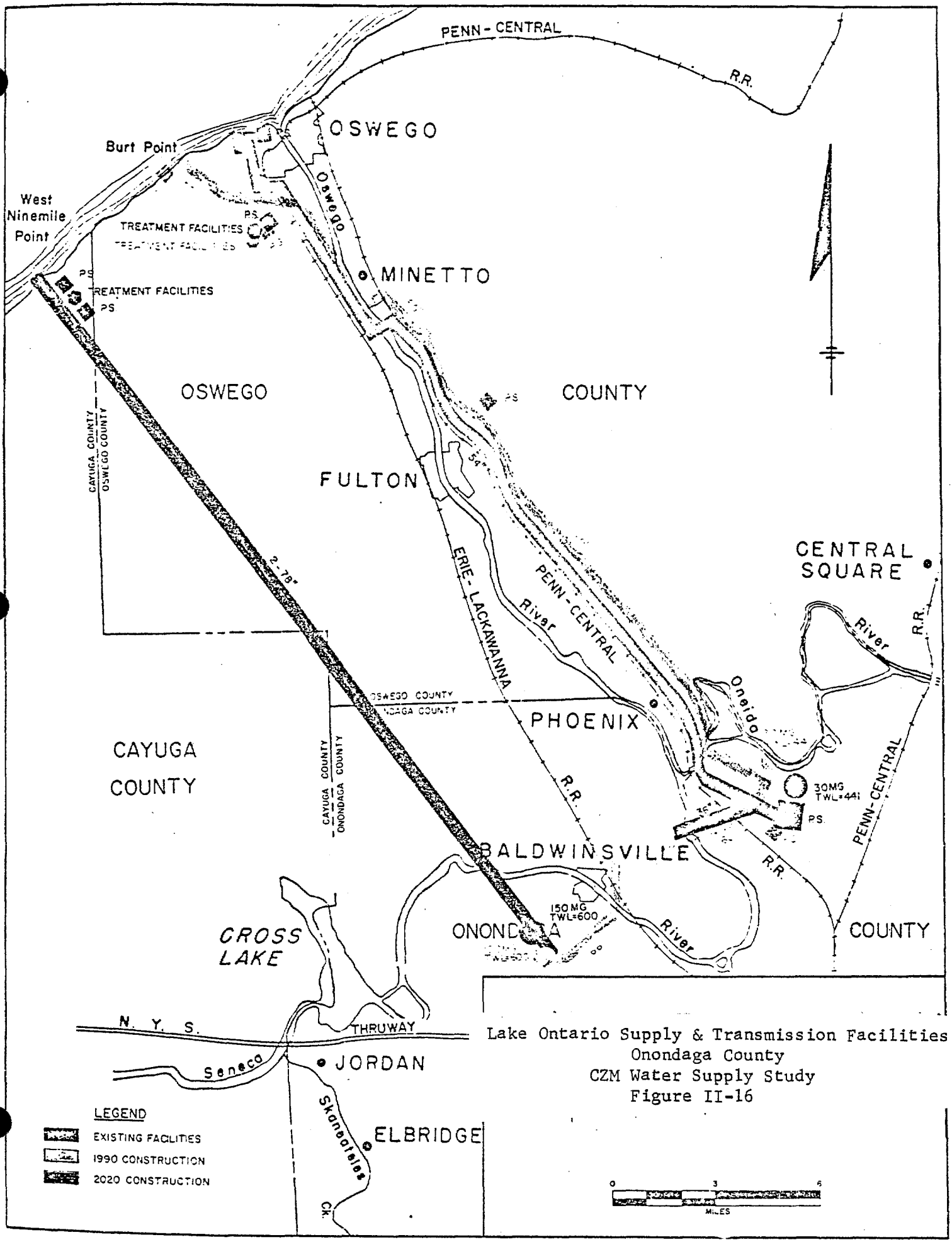
Water System	Existing Sources & Capacity: Sources	System Capacity (mgd)	Projected Demand (mgd): 1974	1990	2020	Alternatives to Meet Future Needs
Oswego (c)	Lake Ontario	34.0	10.00	16.02	25.72	
Onondaga Co. Water District	Lake Ontario	25.0	9.42	73.02	154.59	Two new intake sites on Lake Ontario at Burt Pt., Oswego County, and West Nine Mile Point, Cayuga Co.



Existing Water Facilities
Oswego County
CZM Water Supply Study
Figure II-14



Anticipated Water Supply Service Areas
Oswego County
CZM Water Supply Study
Figure II-15



Lake Ontario Supply & Transmission Facilities
Onondaga County
CZM Water Supply Study
Figure II-16

JEFFERSON COUNTY

The coastal area of Jefferson County is heavily oriented to recreation. There are 15 State Parks along either Lake Ontario or the St. Lawrence River which occupy a total of 3,800 acres of the coastline. In addition, there are several town and village parks along the coast. The northern half of the county borders the Thousand Islands area, famous for its scenery and recreational opportunities. The Villages of Cape Vincent, Clayton and Alexandria Bay are major recreation centers and have large population increases during the summer. This puts a burden on their water supply systems. Average daily demand increases about fifty percent during this time.

The shore of Jefferson County, between the Oswego-Jefferson County line and Tibbett's point at the head of the St. Lawrence River, is very uneven and contains several deep bays and prominent headlands. The total length of the shore is about 120 miles. For 10 miles north from the Oswego County line, a barrier beach and sand dune extend in nearly a straight line, separating marsh areas and small ponds from the open lake. At the end of the 10-mile reach, the shore characteristics change abruptly. Rock outcrops at the water's edge and rises gradually to a height of about 75 feet on the west side of Stony Point. It then falls gradually as the shore continues around Stony Point into Henderson Bay. From Henderson Bay to Tibbett's Point the shoreline is very irregular with deep bays predominating. Some of the bays have marsh areas at their inner end.

The shoreline along the St. Lawrence River section of Jefferson County is quite variable in relief. There is little beach area and rock is very close to the surface. As the name, Thousand Islands implies, there is a multitude of islands of all sizes dotting the River in this reach.

The major streams cutting across the coastal areas in Jefferson County are Sandy Creek, Stony Creek, Black River, Perch River and Chaumont River.

Jefferson County, except for some isolated areas, is not lacking in groundwater resources. The groundwater for individual use is obtained principally from wells drilled in bedrock. Surficial deposits are usually too thin to

support a water table. Buried glacial channels are a possible source of groundwater locally. The water is generally of good quality but hard. Excess iron, sulphur and salt are problems locally. The problem areas of the county seem to be principally those covered by lacustrine clays found in the Towns of Cape Vincent, Henderson and Hounsfield.

Description of Public Water Supply Systems

There are ten public water supply systems in Jefferson County near the coastline. The largest system supplies the City of Watertown which serves about 34,000 people as well as several industries. The remaining nine systems are small, with demand less than 0.5 mgd. Six of the systems take their source of supply from Lake Ontario or the St. Lawrence River. Following is a description of the existing water supply systems, their present and projected needs and suggested alternatives for meeting needs.

City of Watertown

The City takes its water supply from the Black River, near its eastern boundary. The treatment plant is over 60 years old. The Jefferson County Comprehensive Public Water Supply Study recommends that Watertown and the adjacent communities of Brownville, Glen Park and Dexter join together with portions of the adjacent towns in a regional system. Several alternative schemes of supplying the system were considered using either Lake Ontario or the Black River as a source.

The Black River was recommended as the source of supply with the existing Watertown treatment plant supplying treated water. Around 1990, a new treatment plant would be needed. Figure III-17 shows the projected 1990 and 2020 service areas.

Village of Sackets Harbor

The Village obtains its water from Lake Ontario through an intake located on the shore southwest of the Village (see Figure II-18) The water is treated before use. The supply is expected to be adequate in quantity for the next 45 years.

Village of Alexandria Bay

The Village derives its water supply from the St. Lawrence River. The water receives only chlorination before use. The Village is subject to seasonal variations in population and, consequently, in demand. Golf course watering also creates fluctuations in demand.

Improvements in the distribution system and in pumping and storage facilities were made in the 1960's. It may be necessary to filter the water in the future.

Village of Cape Vincent

Cape Vincent takes its water supply from the St. Lawrence River. The water receives only chlorination before use now, but filtration may be necessary in the future.

The village received permission from DEC in 1974 to refurbish the pumping, chlorination and storage facilities. The new pumping facilities are capable of meeting projected future demands.

Village of Chaumont

The village takes its water supply from Lake Ontario. The water is filtered before use and maximum capacity of the filtration plant is 385,000 gallons per day. Source supply, pumping capacity and filtration facilities are expected to be adequate through 2020.

Village of Clayton

The St. Lawrence River is the source of supply for the Village of system. The water is not filtered. Bacterial count varies widely and filtration may be necessary in the future. Source supply and pumping capacity are adequate for the planning period.

Thousand Island Park

The Park located on Wellesley Island, is supplied by a privately owned water system between April 15 and October 10. During the remaining part of the year, the residents use individual well supplies. Water supply for the system is taken from the St. Lawrence River. The water is not filtered before use. The pumping facilities, while old, are considered adequate.

During the summer months the lakeshores in the Towns of Henderson, Hounsfield and Ellisburg are heavily populated. Many of the seasonal residents use water from the lake for all purposes except drinking. Drinking water is often transported in or taken from individual well supplies.

No new water supply systems are expected to be constructed in the foreseeable future along the coastline of Jefferson County. Present and projected population densities are too low to make a project economically feasible.

Table II-7 summarizes the present and projected water supply demands and alternatives to meet needs of the above discussed systems.

Boundary Line Determination

There are no special boundary line considerations necessary for water supply in Jefferson County. It appears that the pump stations for the six communities that use either Lake Ontario or the St. Lawrence River as source are located near the water's edge and would fall within even a minimum management area.

Areas for Protection

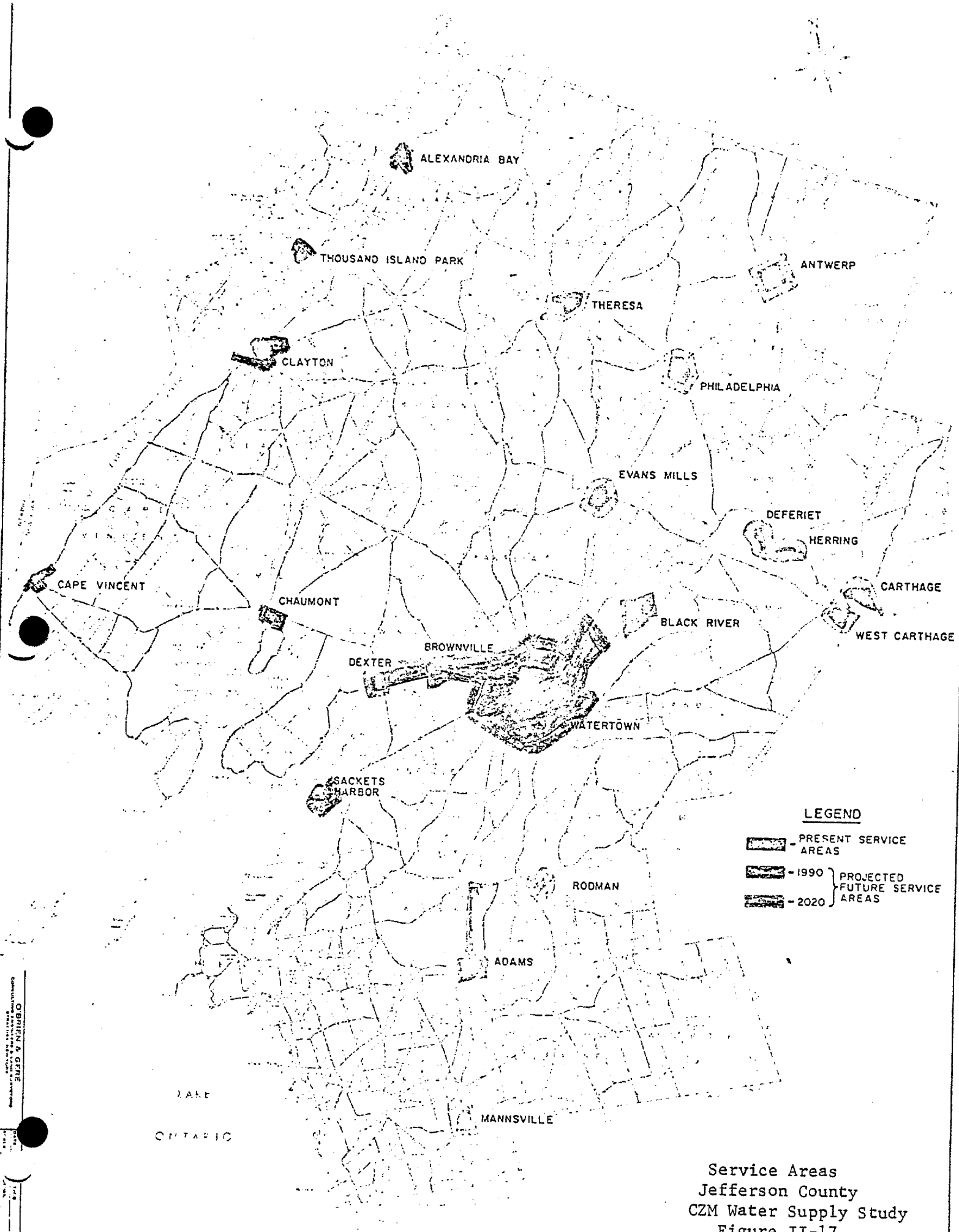
There are no significant groundwater aquifers near the coastline in Jefferson County. The pumping and treatment facilities of Alexandria Bay, Clayton, Cape Vincent, Clairmont, Thousand Island Park and Sackets Harbor which are located on the coastline should be protected. If watershed rules have been established for the intake areas of these systems, they should be taken into account when determining the management plan.

TABLE II-7

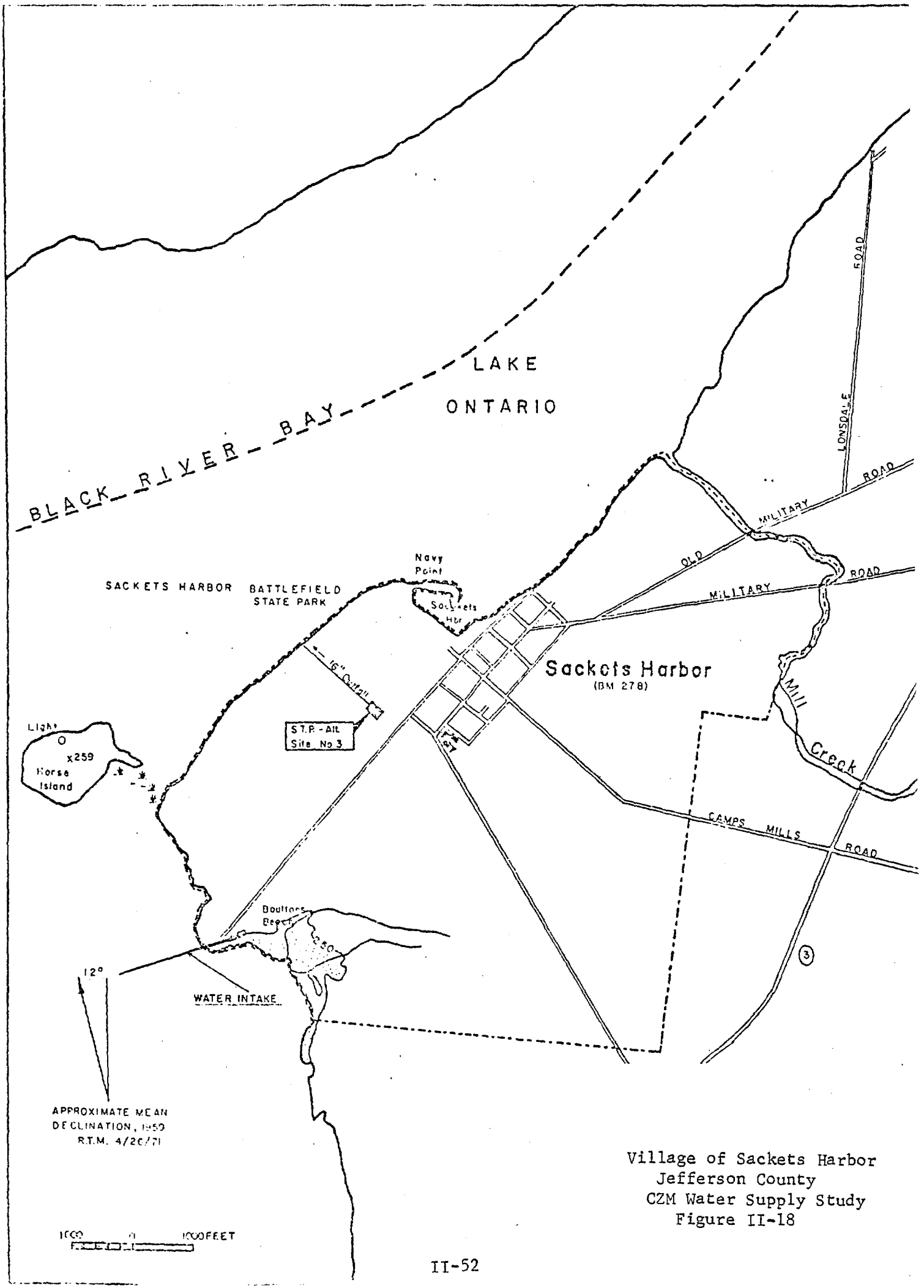
Existing Public Water Supply Systems

Jefferson County

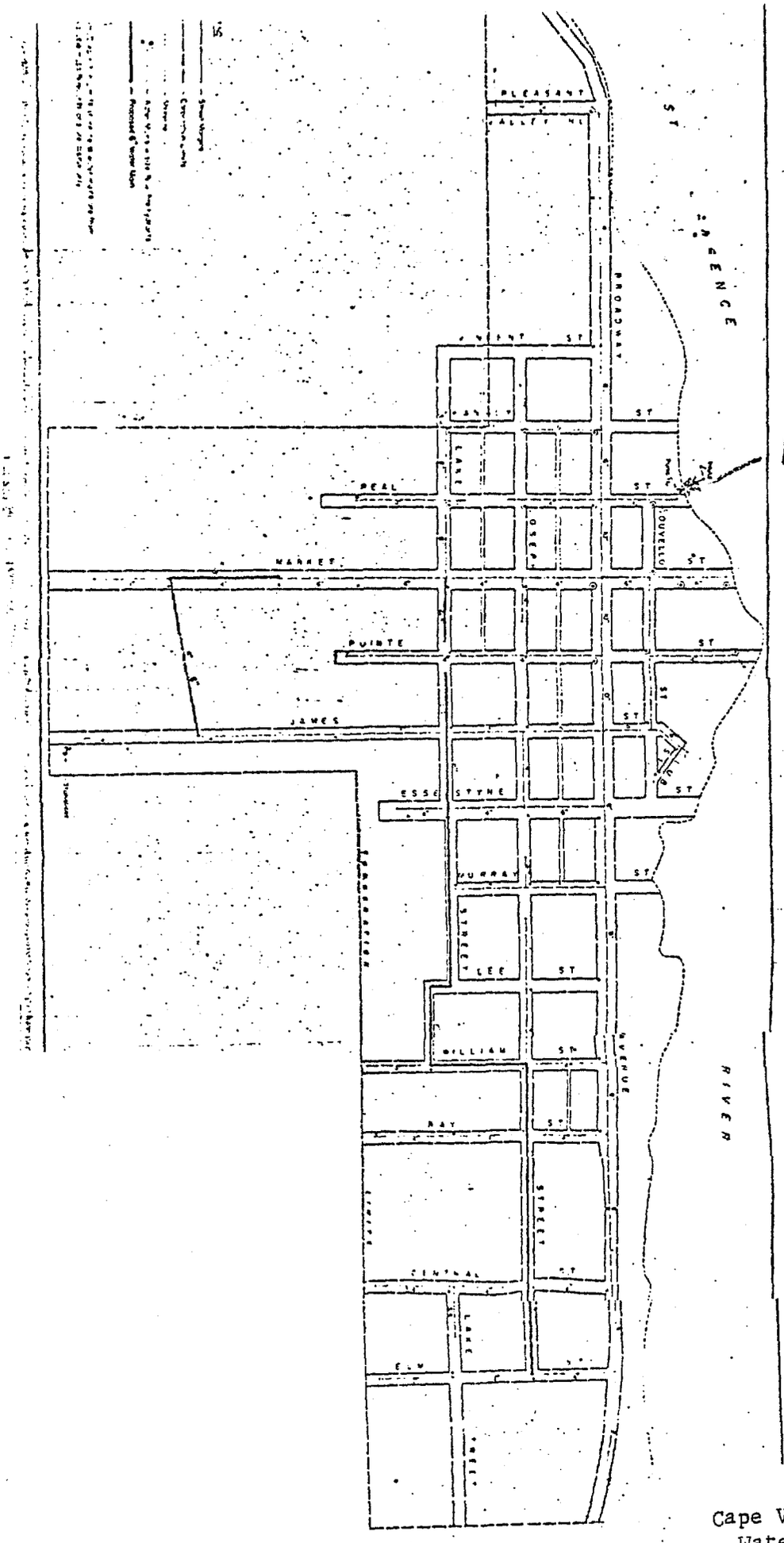
Water System	Existing Sources & Capacity: Sources	System Capacity (mgd)	Projected Average Daily Demand (mgd): 1970		1990	2020	Alternatives to Meet Future Needs
Watertown	Black River	9.0	4.8		6.02	7.13	
Brownville	Well	0.29	0.11		0.25	0.31	Join a county water District. Around 1990, add to treatment plant.
Dexter	Well	0.14	0.11		0.11	0.13	
Sackets Harbor	Lake Ontario	0.58	0.14		0.17	0.20	
Glen Park	Village of Brownville	-	-		-	-	Same as Brownville
Alexandria Bay	St. Lawrence River	N.A.	0.4 0.6	(w) (s)	0.48	0.62	
Cape Vincent	St. Lawrence River	N.A.	0.18 0.27	(w) (s)	0.22	0.27	
Chaumont	Lake Ontario	0.385	0.05		0.07	0.09	
Clayton	St. Lawrence River	N.A.	0.47 0.60	(w) (s)	0.54	0.58	
Thousand Is. Park	St. Lawrence River	N.A.	0.20		0.31	0.47	



Service Areas
Jefferson County
CZM Water Supply Study
Figure II-17



Village of Sackets Harbor
Jefferson County
CZM Water Supply Study
Figure II-18



Cape Vincent Village
Water System Map
CZM Water Supply Study
Figure II-19

St. Lawrence County

The topography of the county was greatly effected by the glacial activities of the Ice Age. The limestone and sandstone formations underlying the potential coastal zone are overlain with deposits of sand and gravel. As a result, groundwater is readily available although the water may be hard. The entire county drains into the St. Lawrence River via the Oswegatchie, Raquette, St. Regis and Grass Rivers as well as several small streams.

Description of Public Water Supply Systems

There are five water supply systems operating in the coastal area of St. Lawrence County. Four of the five take their water supply from the St. Lawrence River. The amount of water withdrawn by these systems is miniscule compared to the St. Lawrence River flow of 164 billion gallons which flow by Massena daily. The municipal water systems within the coastal zone in St. Lawrence County are listed in Table II-8 and described briefly below.

Village of Morristown

The village obtains its water supply from the St. Lawrence River. The water is filtered and chlorinated before use. The pumping and treatment facilities are nine years old and are considered adequate through 2020. Figure II-20 shows the location of the facilities and the extent of the distribution system.

City of Ogdensburg

The City takes its water from the St. Lawrence River. The present water supply and treatment facilities date back to 1910. The distribution system is old and leaks excessively. The storage system is adequate.

The St. Lawrence County Comprehensive Water Supply Study recommends that the existing pumping and treatment facilities should be replaced and new storage facilities should be added. The location of the

existing and proposed facilities as well as the extent of the distribution system appears on Figure II-21

Ogdensburg has a deep water port with access to the St. Lawrence Seaway. As such, its growth potential is considerable. So far, it has been unable to attract any major industry. It is likely that any large water user locating in the area would obtain its supply directly from the St. Lawrence River.

Village of Waddington

Water from the Village system is obtained from two 17 year old drilled wells located within its boundaries. Treatment is provided for hydrogen sulfide removal. The supply and treatment facilities are expected to be adequate through 2020. Figure II-22 shows the location of the wells and the areal extent of the distribution system.

Tucker Terrace Water Company

This is a small privately owned system located about four miles northwest of Massena. The system shown on Figure II-23 serves a residential subdivision of approximately 90 people.

Water is taken from the St. Lawrence River and is filtered through pressure type diatomaceous earth filters before use. The only system deficiency noted in the St. Lawrence County Comprehensive Public Water supply study is the 300 gallon pressure tank. The study recommends its replacement with a 1500 gallon capacity tank.

Village of Massena

The Village distribution system is located away from the coastal area, being about three miles south of the St. Lawrence River. However, the Village's pumping station is located on the shoreline of the River, at the mouth of the Massena Power Canal. The treatment plant is located

on the south bank of the Power Canal, about one mile from the St. Lawrence River shoreline. Figure II-24 shows the location of these facilities.

The St. Lawrence County Comprehensive Water Supply Study indicates that the pumping facilities are adequate through 2020. It recommends that, to compensate for a shortage of storage capacity, an additional high lift pump be installed at the treatment plant. The treatment facilities are adequate through 2020.

Self Supplied Industrial Water Systems

The St. Lawrence County Comprehensive Water Supply Study identified 23 self supplied industrial water systems within the county. Of these five are located within the potential coastal zone area and are listed in Table II-9. No other information on these water users is available.

Boundary Line Determination

No special boundary line considerations are required for water supply. The pumping stations of Morristown, Ogdensburg, Tucker Terrace and Massena and Waddington's well field are all located within 500 feet of the St. Lawrence River shoreline. The diversity of use of the shoreline from industrial to residential to recreational makes it difficult to suggest a uniform width for the management area.

Areas for Protection

Possible areas requiring protection are around the intakes of Massena, Ogdenburg, Morristown and Tucker Terrace as well as Waddington's well field. None of these systems have had watershed rules enacted.

TABLE II-8

EXISTING PUBLIC WATER SUPPLY SYSTEMS
Coastal Zone Area
St. Lawrence County

Water System	Existing Sources & Capacity: Sources	System Capacity (mgd)	Projected Demand (mgd): 1970	1990	2020	Alternatives to Meet Future Needs
Morristown	St. Lawrence R.	0.360	0.066	0.091	0.142	
Ogdensburg	St. Lawrence R.	5.25	3.16	3.85	5.14	Modernize system, increase pumping capacity to 7.25 mgd
Waddington	Wells	0.340	0.10	0.16	0.27	
Tucker Terrace	St. Lawrence R.	0.086	0.008	0.014	0.022	
Massena	St. Lawrence R.	5.0	2.07	3.12	5.57	Install additional high lift pump at treatment plant, increasing capacity to 7.5 mgd.

1/ Projected demand for the year 2000

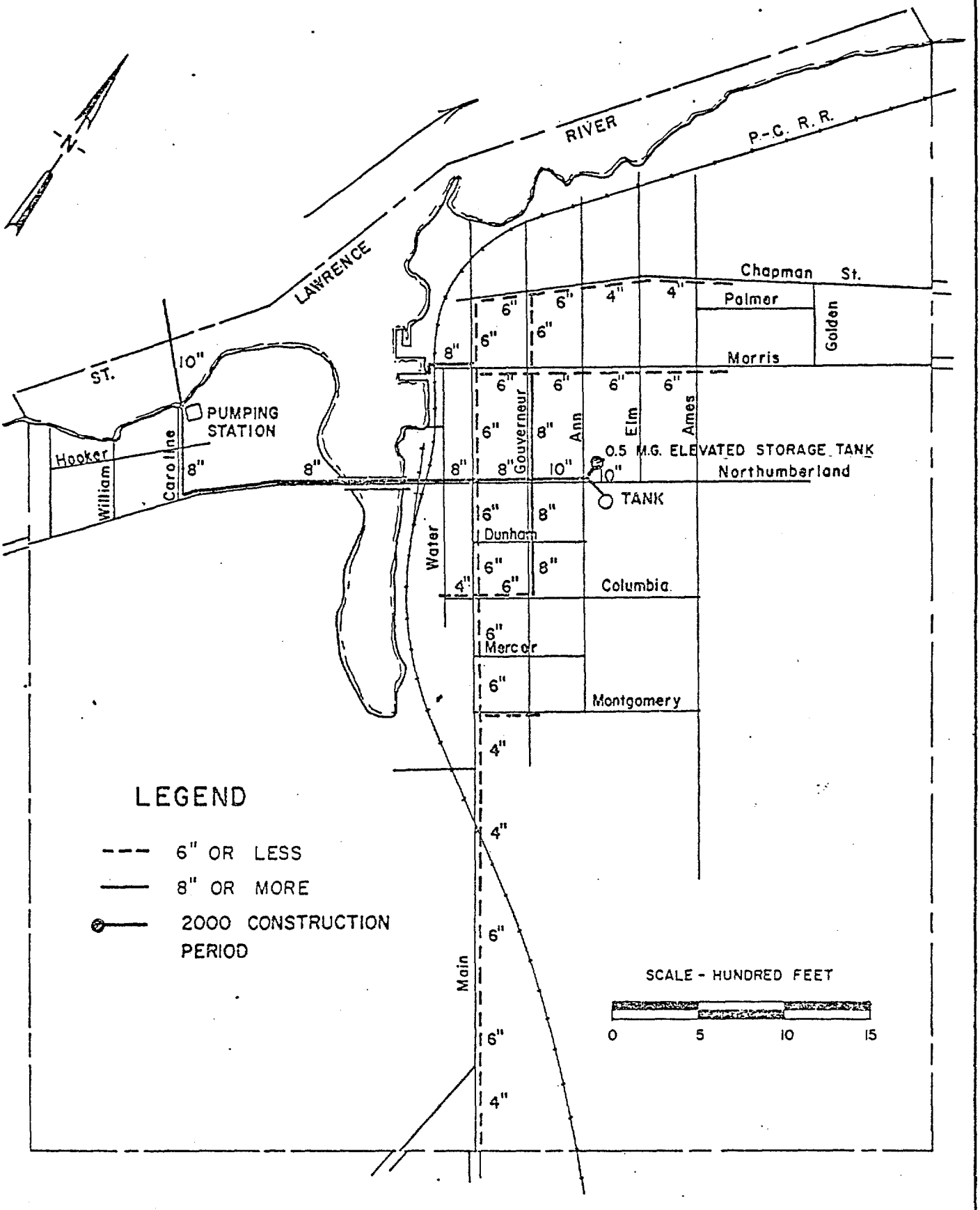
TABLE II-9

MAJOR WATER USING INDUSTRIES OF ST. LAWRENCE COUNTY

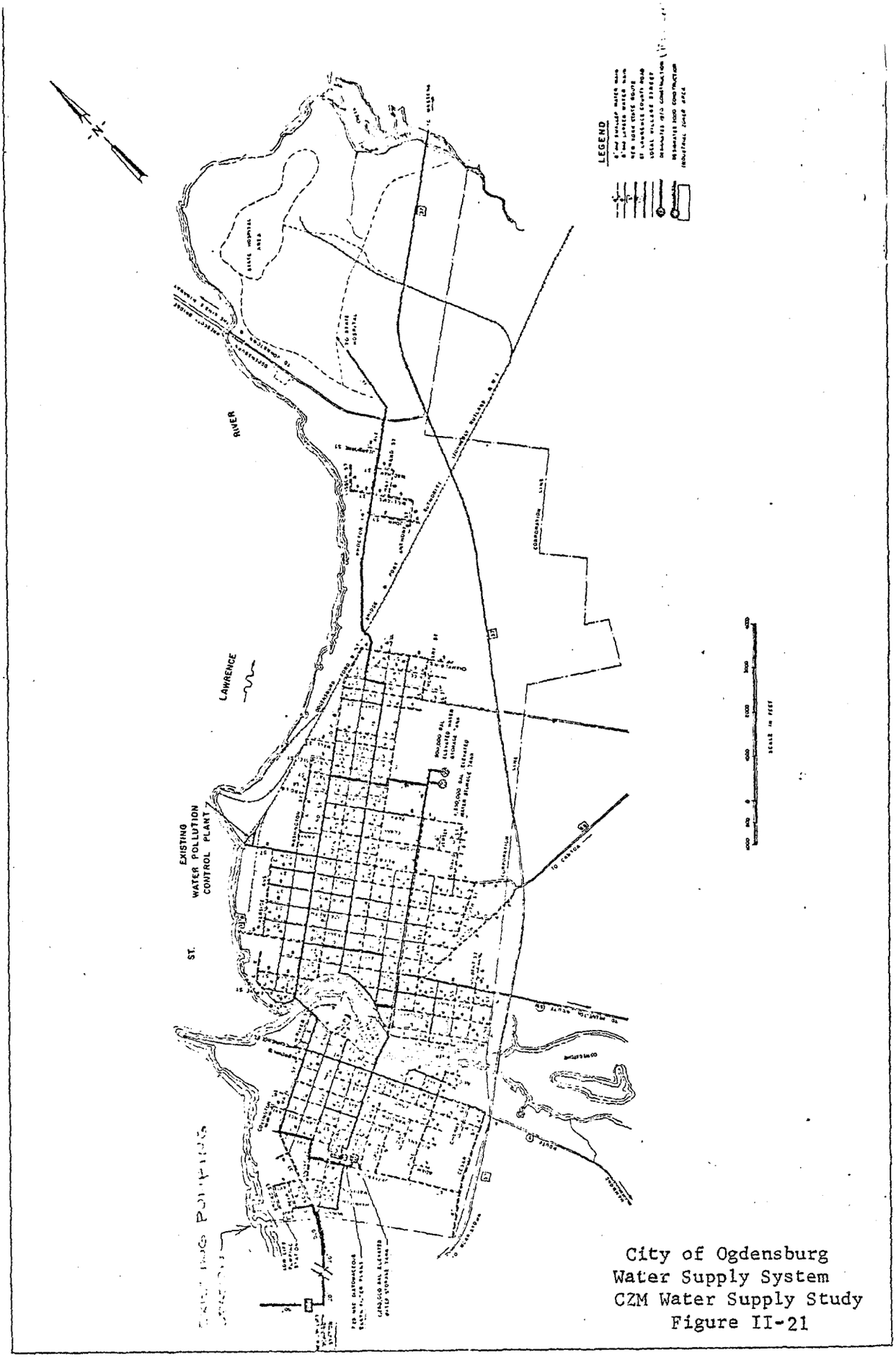
Coastal Zone Area

NAME OF INDUSTRY AND LOCATION	SOURCE OF WATER SUPPLY	WATER DEMANDS IN GALLONS PER DAY AVERAGE	MAXIMUM
ACCO	St. Lawrence River	1,000	1,000
Ogdensburg	Well	6,000	7,500
ALCOA			
Massena	St. Lawrence River	20,500,000	27,000,000
CHEVROLET -G.M.C.	St. Lawrence River	2,500,000	4,000,000
DIAMOND NATIONAL			
Ogdensburg	St. Lawrence River	3,000,000	4,200,000
REYNOLDS METALS			
Massena	St. Lawrence River	8,000,000	10,000,000
	TOTALS	34,007,000	45,208,500

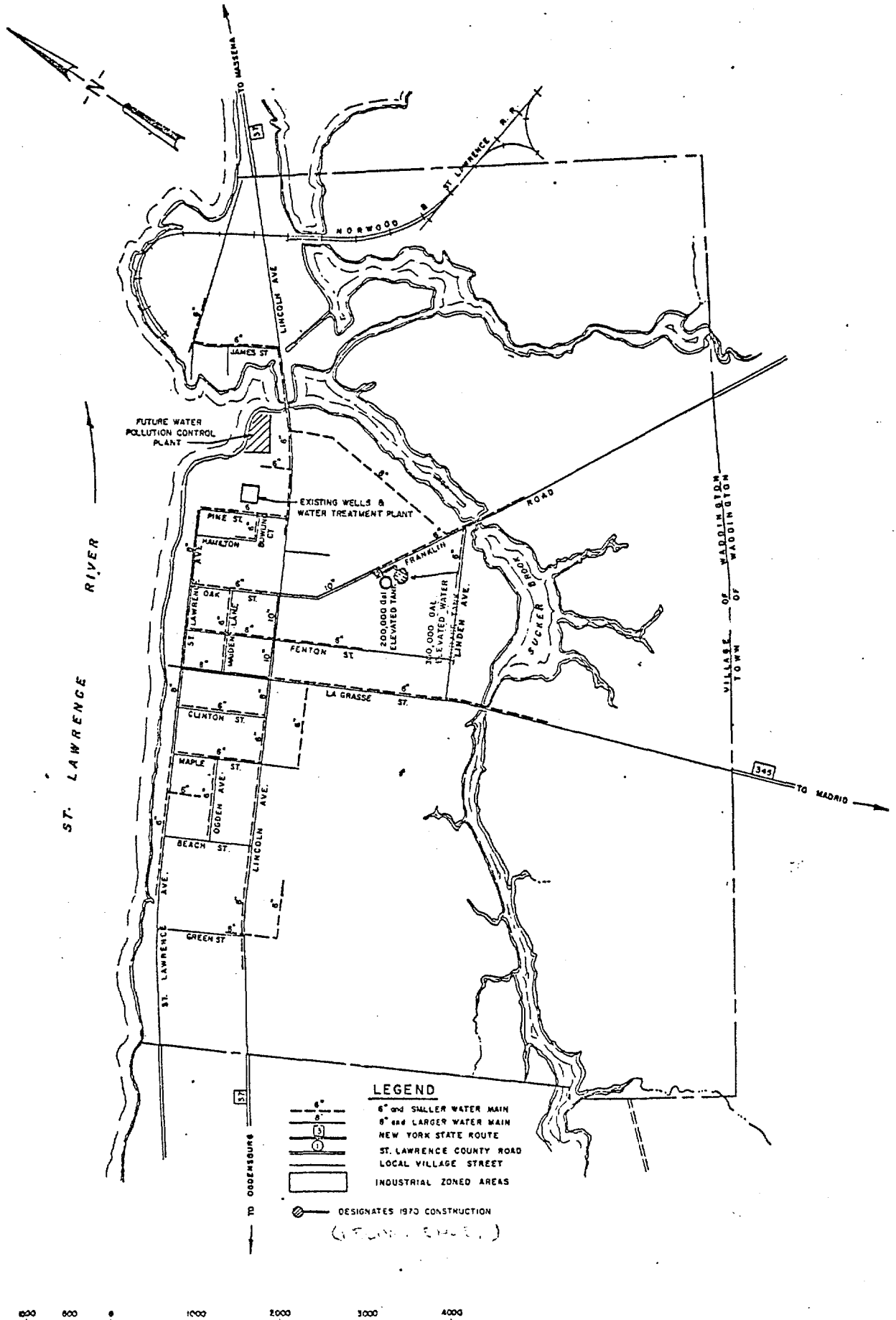
Source: St. Lawrence County Comprehensive Water Supply Study



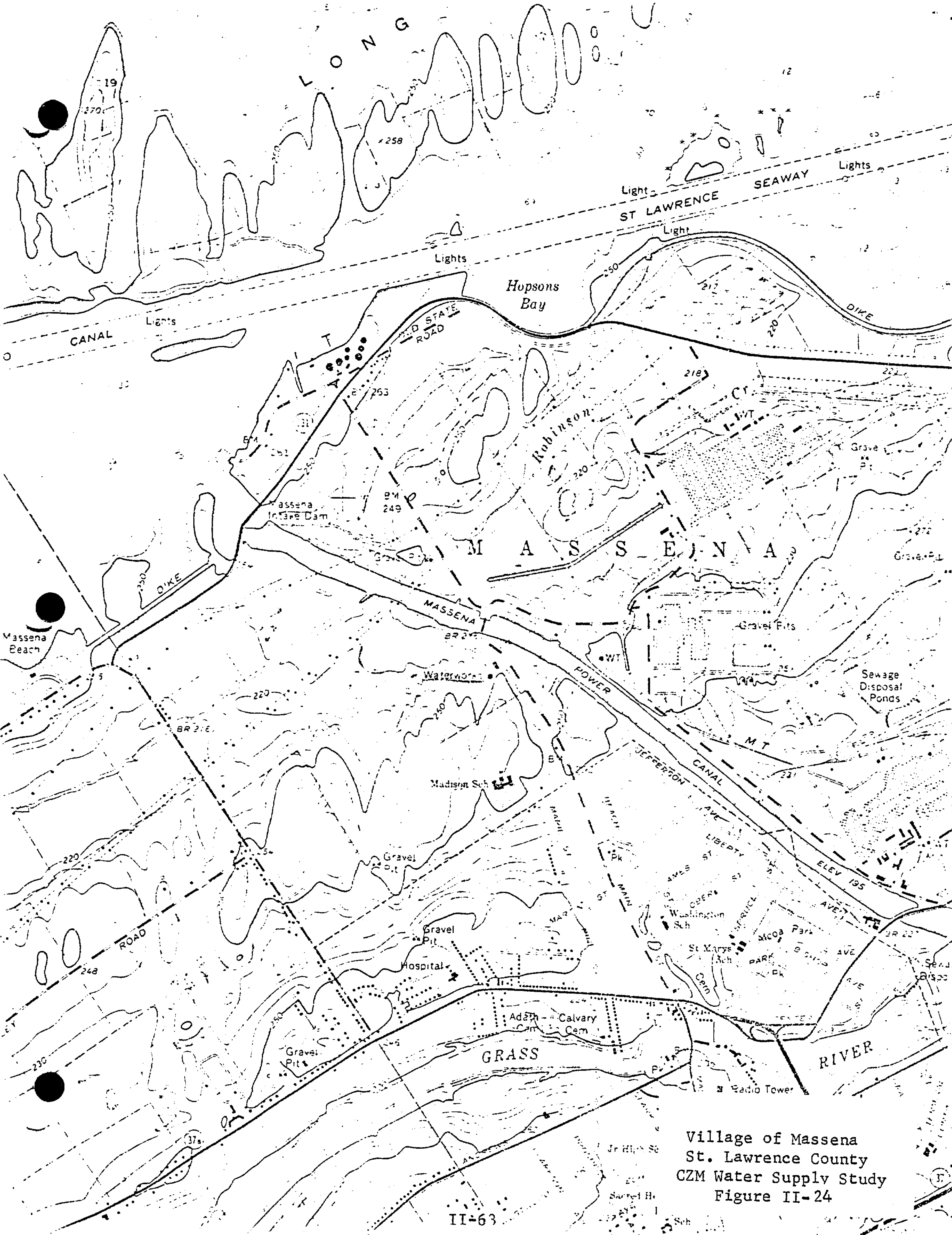
Village of Morristown
Water Supply System
CZM Water Supply Study
Figure II-20



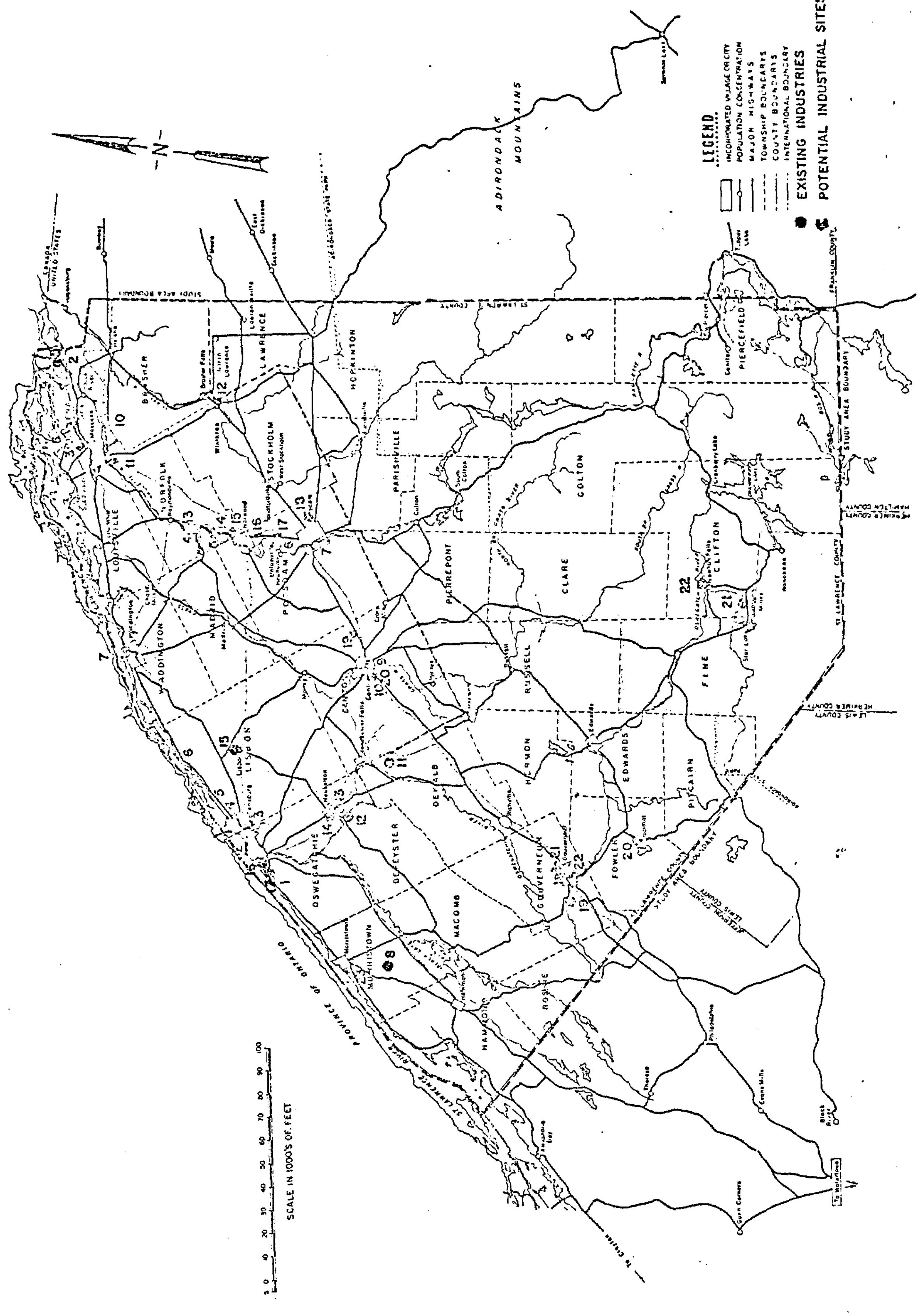
City of Ogdensburg
Water Supply System
CZM Water Supply Study
Figure II-21



Village of Waddington
Water Supply System
CZM Water Supply Study
Figure II-22



Village of Massena
St. Lawrence County
CZM Water Supply Study
Figure II-24



Major Water Using Industrial Sites
St. Lawrence County
CZM Water Supply Study
Figure II-25

Franklin County

This county is located at the downstream end of the St. Lawrence River in New York State. The coastline runs along the St. Regis Indian Reservation for approximately three miles. At present there are no industrial or municipal water supply systems for the reservation within the potential coastal zone.

The Franklin County Comprehensive Public Water Supply Study identified an alternative which would supply water to the reservation from a well in the Hamlet of Hoganburg. The well is located outside the potential coastal zone area.

Boundary Line Determination

There is nothing of value to determine a boundary for coastal zone management.

Area of Protection

There are no areas that need protection.

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SECTION III

HUDSON RIVER SUBAREA

GENERAL

The Hudson River Subarea is the ten counties adjacent to the tidal waters of the Hudson River upstream from New York City. The tidal water of the Hudson River extend approximately 130 miles upstream from New York City to the Federal Dam located between the Village of Green Island, Albany County and the City of Troy, Rensselaer County. The ten counties are: Albany, Rensselaer, Greene, Columbia, Ulster, Dutchess, Orange, Putnam, Rockland and Westchester.

The economy of the area is based primarily on the State Capitol at the upstream end, light industries as well as tourism in the middle and New York City suburbia at the downstream end.

Geologically the area was greatly effected by the glacial activity from the Ice Age which left pockets of surficial deposits of sand and gravel. Some of these deposits provide sources of groundwater in sufficient quantity and quality for a municipal water supply system.

The area contains 321 municipal water districts of which 97 may be effected by coastal zone management measures. For the most part, water sources are located far enough from the shoreline to warrent little if any consideration. However, there are 11 known industrial intakes, 2 infiltration galleries, 2 existing municipal intakes, 2 potential municipal intakes and 8 groundwater aquifers within the potential coastal zone area.

An analysis of the water supply districts for each of the ten counties follows.

Albany County

Albany County contains the western half of the Federal Dam, which is the upstream terminus of the tidal waters of the Hudson River. Employment comes from various industries and the activities related to a state capital. The chief industries are printing and publishing, textiles, machinery and metal products, plus stone products.

About three quarters of the county drains towards the Hudson River. The Normanskill and the Snake Hill Formations are located along the Hudson River. These shale formations yield very little groundwater and are not commonly considered aquifers. The major streams are Normanskill, Vloman Kill, Coeymans Creek and Hannacrois Creek.

Municipal Water Systems

Albany County has fifteen water districts. Of these, six are supplied totally or partially by groundwater. Eleven Districts use surface water as a source. Three Districts purchase part or all of their water. The seven Districts located within the coastal plain area are shown on Table III-1 and are described below.

1. City of Cohoes

The City of Cohoes is technically upstream from the coastal zone area, but it does sell water to the Village of Green Island, which is in the coastal zone area. Water is taken from the Mohawk River through the power canal of the Niagara-Mohawk Power Corporation. The treatment facilities are adequate to meet the City's projected demands to 2020. However, changes in the pumping and transmission facilities are needed to meet projected future demands to 2020 for both the City and the Village.

2. Village of Green Island

An infiltration gallery on Center Island in the Hudson River was the original source of water for the village. During the severely cold winter of 1962-63, the gallery yielded only 0.75 mgd, which was half of its rated capacity. In 1963, the village entered into a 40-year contract with the City of Cohoes to provide them with water through a 16-inch main. Both sources are currently being used. In CPWS-43, a recommendation to phase out the gallery was made. Alternatives for purchase of water from the City of Cohoes or the City of Watervliet as well as the interconnection of all three communities were considered viable.

3. City of Watervliet

In 1916, the City developed a public water supply on Norman's Kill approximately 13 miles west of the City in the Town of Guilderland known as Watervliet Reservoir. The reservoir has excess capacity to meet projected needs to 2020. However, improvements in the transmission mains and an expansion of the water treatment plant will be required. In addition to the interconnections with Cohoes and Green Island described above, expansion of the system for the Town of Guilderland was considered.

4. Village of Menands

In 1955 the village entered into a 40-year contract with the City of Troy for the purchase of a minimum of 1.5 mgd to a maximum of 4.5 mgd. Water is pumped under the Hudson River through a 20-inch main. No problems are expected to meet projected future needs to 2020.

5. City of Albany

The City in 1932 abandoned the Hudson River as a source of supply and constructed the Alcove and Basic Reservoirs on Hannacrois and Basic Creeks respectively. The reservoirs are located approximately 13 to 15 miles southwesterly from Albany. A decision by the former Water Resources

Commission requires that the City must release water to supply the needs of the Village of Ravena located downstream from the Alcove Reservoir. The existing sources would be adequate to meet projected demands for the City, but cannot satisfy projected demands for Ravena too. The City will need to make alterations to its system by 2020 either to satisfy projected increases in demands for Ravena or to meet the City's peak demands with the treatment plant. CPWS-43 recommends a new source of supply from either Catskill Creek about 7 miles south of the county line in the Town of Cairo, or Normans Kill below the Watervliet Reservoir.

6. Town of Bethlehem

Bethlehem Water District No. 1 supplies water to approximately 81 percent of the population of the Town of Bethlehem. The present sources of supply are two dug wells, a reservoir on Vly Creek and a diversion dam on the West Fork of Onesquethaw Creek; all are located in the Town of New Scotland. In CPWS-43, the demands of the Town of New Scotland were combined with the Town of Bethlehem since no other sources were available within the Town. As a result, the system will not meet projected demands by 1988. The three alternative sources for a combined system are a diversion dam on Normans Kill, a reservoir on Vloman Kill or a reservoir on Onesquethaw Creek.

7. Village of Ravena

The village draws water from Hannacrois Creek at Deans Mills, in the Town of Coeymans, Greene County. Through a decision by the former Water Resources Commission, the City of Albany must release sufficient water from its Alcove-Basic Reservoir System to meet the villages demands.

Self-Supplied Industrial Water Systems

The reconnaissance study recorded fifteen major industrial water users for Albany County in 1965. Of these, fourteen were supplied partially water from public water supply systems. Five systems take water from the Hudson River through their own systems. The major industrial water users are listed in Table III-2.

Boundary Line Determination

From a water supply standpoint, the location of a boundary line for coastal zone management appears unimportant. All municipalities obtain all or part of their water outside the zone. An educated guess concerning the self supplied industrial use would be that the water is used for cooling and water quality is not a major concern in their water use.

Areas of Protection

Groundwater use is miles away from the Hudson River and does not affect a coastal zone management plan. The type of industries presently using the Hudson River do not appear to require special protection for their intakes. Only the infiltration gallery on Center Island for the Village of Green Island appears as a possibility. If this is phased out of use as recommended by the consultant, no protection would be required.

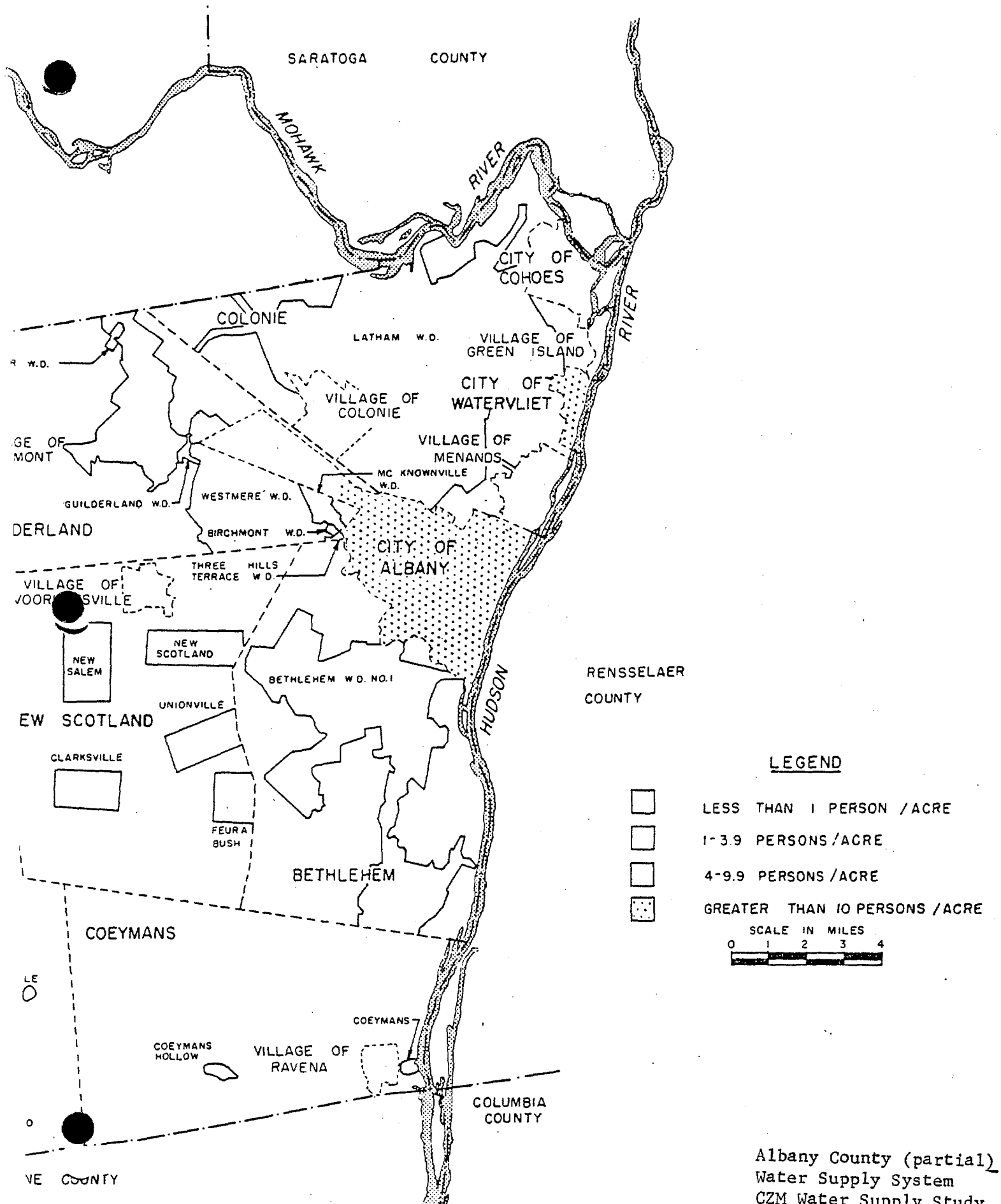
TABLE III-1
Existing Public Water Supply Systems
Coastal Zone Area
Albany County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (MGD)	Projected Demand (MGD): 1970	Projected Demand (MGD): 1990	Projected Demand (MGD): 2020	Alternatives to Meet Future Needs
Cohoes (C)	Mohawk R.	15.0	5.6	5.7	9.0	1. None w/o Green Island (V) 2. Change mains
Green Island (V)	Hudson R. Cohoes (C)	0.75 (16" main)	1.1	1.5	4.0	Purchase from Cohoes and/or Watervliet
Watervliet (C)	Watervliet Reservoir	9.4	3.9	4.6	5.0	None w/ main changes
Menands (V)	Troy (C)	(20" main)	1.8	2.5	3.5	None
Albany (C)	Alcove Res. Basic Res. Silver Cr. Res.	32.0 (filter)	22.0	26.6	32.8	1. None with changes in plant and mains 2. Catskill Cr. 3. Normans Kill
Bethlehem (T)	Vly Cr. Res. 2 wells	3.1 0.4	1.4	2.6	7.5	1. Normans Kill 2. Vloman Kill 3. Onesquethaw Creek
Ravena (V)	Hannacrois Cr. Res.	1.0 (filter)	0.4	0.5	0.6	None w/ releases from Alcove-Basic Res.

TABLE III-2
Self-Supplied Industrial Water Systems
Coastal Zone Area
Albany County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (MGD)*	Projected Demand (MGD)**: 1970	1990	2020	Alternative to Meet Future Needs
Allegheny Ludlum Steel Corp.	Hudson R. & Reservoir	4.30	6	9	15	
Ford Motor Corp.	Hudson R.	0.79	1	2	3	
John A. Manning Paper Co.	Hudson R.	7.15	9	15	24	
Atlantic Cement Co.	Hudson R.	1.20	2	3	4	
Niagara-Mohawk Steam Gen. Plant	Hudson R.	520.00	660	1100	1750	
ALBANY COUNTY TOTAL**		533.44	679	1132	1794	

* 1965 withdrawal
** County Total Estimated in TAMS Recon. Report Proportioned to Nearest MGD



Albany County (partial)
Water Supply System
CZM Water Supply Study
Figure III-1

Rensselaer County

Rensselaer County contains the eastern half of the Federal Dam, which is the upstream terminus of the tidal waters of the Hudson River. The economy of the western and central sections of the county is closely linked to the Capital District. About one-third of the labor force in that area is employed in Albany County. Employment elsewhere comes from firms engaged in manufacturing, wholesale trade, retail trade and service industries.

The northern and eastern portions of the county lie within the Hoosic River watershed, which drains into the Hudson River upstream of Troy. The remainder of the county is drained in a westerly direction towards the Hudson River by the Poestenkill, Wynantskill, Moordenerkill, Kinderhook Creek and numerous smaller streams.

No major aquifers lie within the area generally considered the coastal zone. The geology adjacent to the Hudson River contains shale from the Normanskill shale and the Snake Hill Formation.

Municipal Water Systems

Rensselaer County is unique in that a large portion of the county is supplied from one source, Tomhannock Reservoir. Twenty water districts including the Village of Menands in Albany County takes water from sources in Rensselaer County. Twelve districts use groundwater entirely. One district uses both surface and groundwater. Schaghticoke Water District No. 2 purchases its water from the Village of Mechanicville in Albany County. The two water systems for the coastal zone area are listed in Table III-3 and described briefly below.

City of Troy

The Tomhannock Reservoir was built by the City of Troy, who sells water to most of the coastal zone area in Rensselaer County. Through six separate

contracts, the City sells water to water distrcits in the Towns of Brunswick, East Greenbush, North Greenbush, and Schaghticoke as well as the villages of Rensselaer and Menands (Albany County). In CPWS-76, new treatment and transmission facilities are recommended to meet projected demands for 2000. The safe yield of the reservoir was revalued after the mid 1960's drought from 45.8 MGD to 35.5 MGD. Projected demands for 2020 for the entire system are slightly more than the latter estimate. An alternative source of supply to the southern portion of the service area (around the village of Rensselaer) is a reservoir on Tsatsawassa Creek.

Village of Castleton

The Village of Castleton takes water from Vlockie Kill and sells a portion of it to the Maple Hill Park Public Water System. The safe yield of the source is about 0.5 MGD. CPWS-76 foresaw a possible water quality problem with the development of the watershed upstream from the diversion dam. With this development toward the east, expansion was toward a aquifer near the middle of the county, which was recommended for development as a replacement.

Self Supplied Industrial Water Systems

TAMS Reconnaissance Study listed eleven major industrial water users within the county. Six industries purchase water from public water supply systems. Two of the five industries listed as self supplied take water from the Hudson River. CPWS-76 lists Winthrop Laboratories as having a self supplied system (not listed in TAMS). Table III-4 lists the self supplied industries.

Boundary Line Determination

From a water supply standpoint, the determination of the boundary line appears unimportant. The high yielding aquifers are located miles

from the Hudson River. No municipal water supply systems take water from the Hudson River. Two or three industrial systems might be using the Hudson River.

Areas of Protection

There are no areas in apparent need of protection.

TABLE III-3

Existing Public Water Supply Systems
Coastal Zone Area

Rensselaer County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity MGD	Projected Demand (MGD): 1970	Projected Demand (MGD): 1990	Projected Demand (MGD): 2020	Alternatives to Meet Future Needs
Troy (C)*	Tomhannock Reservoir	35.5 (source)	23.5	29.5	37.2	Tsatsawassa Creek
Castleton (V)**	Vlockie Kill	0.5	0.4	1.5	2.6	wells

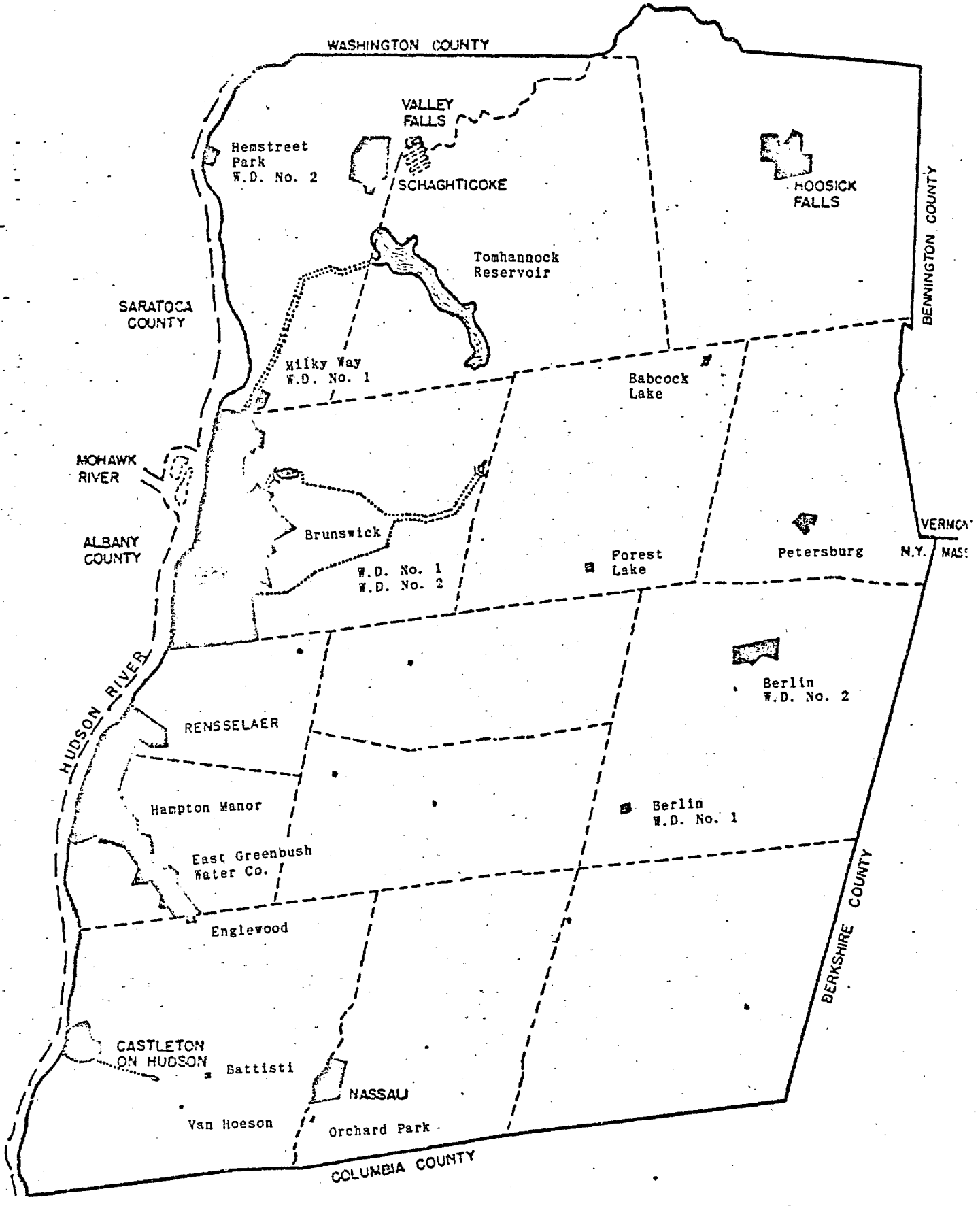
* Sells water to water districts in seven communities

** Sells water to Maple Hill Park P.W.S.

TABLE III-4
Self-Supplied Industrial Water Systems
Coastal Zone Area
Rensselaer County

	Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (MGD)*	Projected Demand (MGD)**: 1970	1990	2020	Alternatives to Meet Future Needs
***	General Aniline & Film Corp.	Hudson R.	4.30	5.6	11.0	30.7	
	Republic Steel Corp.	Hudson R.	5.70	7.4	14.6	40.7	
	RENSSELAER COUNTY TOTAL**		9.60	12.5	24.6	68.6	
	Winthrop Laboratories						

* 1965 withdrawal
** County Total in TAMS Recon. Report Proportioned to Nearest 0.1 MGD
*** Firm is shown on map, but was not listed in table (TAMS error?) proportioned by County total



Rensselaer County
Water Supply System
CZM Water Supply Study
Figure III-2

Greene County

Greene County is located along the westerly shore of the Hudson River immediately downstream (south) of Albany County. Employment in the county comes from manufacturing and activities associated with seasonal recreation in the summer. The major manufacturers are apparel as well as stone, clay and glass products.

The western half of the county drains northwesterly through the Schoharie Creek watershed. The eastern half drains easterly towards the Hudson River through the watersheds of Catskill Creek, Coxsackie Creek, Murderers Creek and other small tributaries. The Normanskill and Deepkill shales formation underlies the eastern boundary of the county in a belt from one to three miles thick.

Municipal Water Supply Systems

Of the eleven municipal water supply systems in the county, four are located in the coastal zone. Three of these use surface supplies from outside the coastal zone as a source. One system uses groundwater. The four systems are listed in Table III-5 and described below. CPWS-25 analyzed seven alternative systems recommending the Hudson River as a source. Unlike other studies, only regionalized systems were considered.

Village of Athens

The village uses Hollister Lake as a source of supply. Since the lake is only 3.1 feet deep, water quality problems occur especially in the summer. The estimated safe yield of the source is 0.35 MGD. The transmission system from the lake to the village is inadequate.

Village of Catskill

The village takes water from its reservoir on Potic Creek, which is capable of yielding 1.22 MGD. Although the reservoir site could hydrologically yield more water, the reservoir cannot be enlarged economically. The treatment and transmission facilities need modifications.

Hamlet of Cementon

Technically, a public water supply system exists in the hamlet since a well from the cement plant supplies the plant,a school and a few houses.

Village of Coxsackie

The Village takes its water from Murderers Kill. At the time of the study (1967), Medway Reservoir was being constructed as an expansion of the source. The estimated yield of the source is 1.22 MGD. Future plans for the village calls for the construction of Beaver Dam Lake in the adjoin watershed.

Regionalized System (Alternative Sources)

CPWS-25 studied the possibilities of intermunicipal systems only. The "Master Plan" proposed two general systems of which the valley system affects the coastal zone area. The seven alternative systems considered three intake sites along the Hudson River and four reservoir sites. The reservoir sites were (1) Catskill Creek near Oak Hill, (2) Catskill Creek near Woodstock, (3) Potic Creek near its confluence with Catskill Creek, and (4) Ten Mile Creek near its confluence with Catskill Creek. The recommended plan called for an intake on the Hudson River between Athens and Catskill.

Self Supplied Industrial Water Systems

Except for the cement plant in Cementon, no self supplied water supply systems are known.

Boundary Line Determination

No major aquifers underlie the coastal zone area. Existing major water supplies transport water from outside the coastal zone. From a water supply viewpoint, boundary line is unimportant.

Areas of Protection

The cement plant at Cementon uses well water from a low yielding aquifer area. In addition, CPWS-25 recommends taking water from the Hudson River. A zone of protection around both areas might be needed.

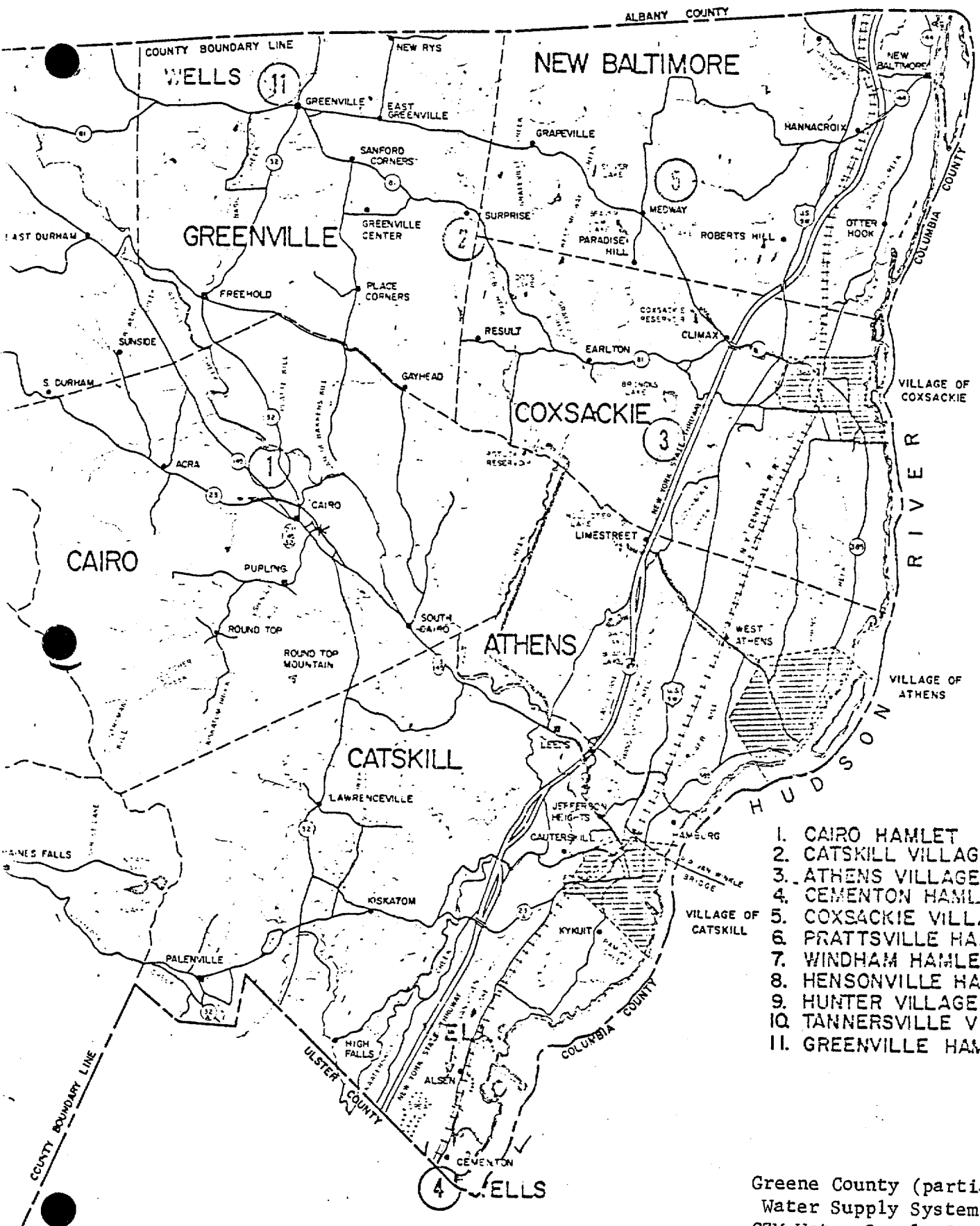
TABLE III-5

Existing Public Water Supply Systems
Coastal Zone Area

Greene County

Water System	Existing Sources & Capacity: Sources	System Capacity (MGD)	Projected Demand (MGD): 1967	2017	Alternatives to Meet Future Needs*
Catskill (V)	Potic Creek	1.22	0.70	1.50	County agency w/
Athens (V)	Hollister Lake	0.35	0.30	0.80	1. Hudson River & wells 2. Catskill Creek 3. Potic Creek 4. Ten Mile Creek
Cementon (H)	Wells**				
Coxsackie (V)	Murderers Kill	1.01	0.40	0.75	

* CPWS-25 considered regional agency only
** Cement plant plus a few homes on system



Greene County (partial)
Water Supply System
CZM Water Supply Study
Figure III-3

Columbia County

Columbia County is located on the easterly bank of the Hudson River immediately downstream (south) from Rensselaer County. The dominant industries include dairy and fruit products, textiles, cement, paper and local service-oriented concerns.

Almost all of the county including the area within the coastal zone drains westerly into the Hudson River. The major tributaries are Kinderhook Creek, Roeloff Jansen Kill and Claverack Creek. The potential coastal zone area is underlain by bedrock from the Normanskill Shale and Nassau Formations, which are not generally considered as high yielding aquifers. Surfacial glacial deposits overlie the bedrock formations resulting in high yielding aquifers near the stream channels.

Municipal Water Systems

The county has twelve public water supply districts. Four of these are located within the coastal zone area. The Village of Philmont (outside the coastal zone area) and the City of Hudson (within the coastal zone area) use surface water for their sources. The remaining water districts use groundwater. The water districts within the coastal zone are listed on Table III-6 and described below.

City of Hudson

In 1904, the City abandoned the Hudson River as a source and developed an upland supply system. The present sources are diversion dams on Taghkanic Creek and Churchtown Creek. The City also has a supplemental source, an abandoned limestone quarry, and two emergency sources, which are an infiltration gallery on Mill Creek within the City limits and an intake on Claverack Creek. The system is inadequate to meet projected demands. CPWS-32 recommended two alternatives. One alternative uses the Hudson

River as its source providing that the water quality was improved sufficiently to assure no recurrence of the epedemic conditions around 1900. The other alternative expands the Churchtown Reservoir and rehabilitates a major transmission main and pump station as its first phase. A reservoir located at the headwaters of Churchtown Creek with pumping facilities from Taghkanic Creek is the second phase.

Town of Greenport

In 1925 the Town formed Water District No. 1 and purchased the water supply facilities of the Hudson Aqueduct Company including Fountain Head Spring. Since then the District has developed three wells. The total yield of the system is estimated as 1.5 MGD. The potential development of a community college near the District indicates that additional groundwater development may be needed.

Town of Stockport

The Town has two water districts. In 1953, Water District No. 1 was formed to purchase a small private water system, which had a well as its source of supply near Claverack Creek in the Hamlet of Scottville. During the drought of the mid 1960's many individual wells went dry resulting in the formulation of Water District No. 2 and the construction of a caisson-type well near Kinderhook Creek. CPWS-32 recommends that the two districts combine their facilities. Future expansion would use new wells along Claverack Creek and/or Kinderhook Creek irregardless of the combined water district proposal.

Self Supplied Industrial Systems

The TAMS Study listed seven major industrial self supplied industrial water users. Of these, two are located in the potential coastal zone area and are listed in Table III-7 The projected demands for the entire group was proportioned for each industry.

Boundary Line Determination

Nearly all of the water supply sources are located more than a mile from the Hudson River. The groundwater aquifers servicing the coastal zone area are located from 2 to 5 miles from the Hudson River. The infiltration gallery for the City of Hudson is located less than 3000 feet from the Hudson River. Since this is an emergency source which is recommended for abandonment, protection of this source is questionable.

Areas of Protection

Potential areas of protection are near the industrial intakes as well as the area surrounding the infiltration gallery for the City of Hudson. CPWS-32 identified a potential groundwater source adjacent to the Hudson River in the Town of Stuyvesant. Although there is no projected needs for this area, perhaps protection is needed.

TABLE III-6

Existing Public Water Supply Systems
Coastal Zone Area

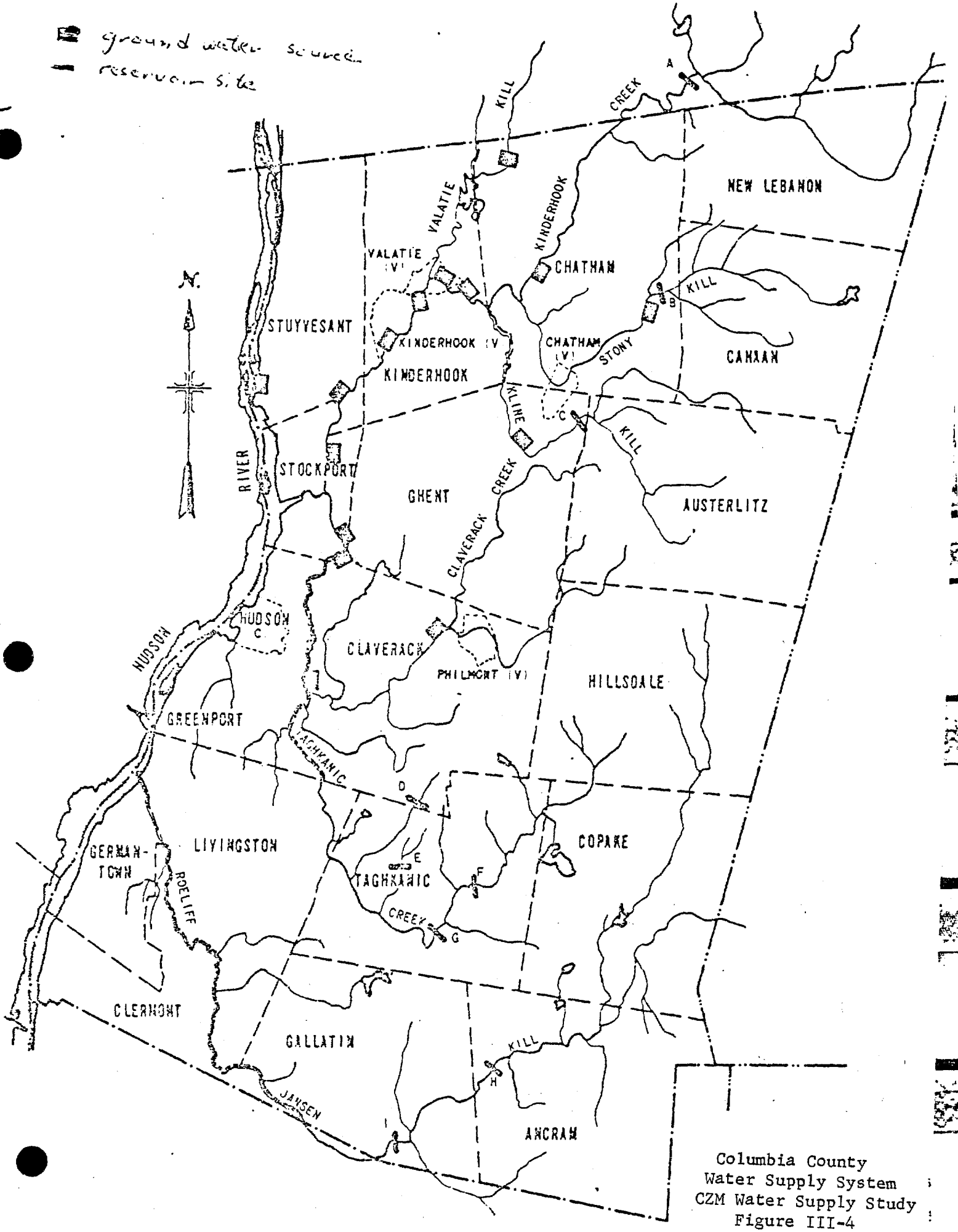
Columbia County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (mgd)	Projected Demand (mgd): 1970	Projected Demand (mgd): 1990	Projected Demand (mgd): 2020	Alternatives to Meet Future Needs
Hudson (C)	Taghkanic Creek Churchtown Creek Claverack Creek Groundwater (2)	1.67	1.54	1.92	2.56	Hudson River (?) Churchtown Creek Taghkanic Creek
Greenport (T) W. D. #1	Spring wells	1.50	0.41	0.73	1.29	Wells
Stockport (T)						
W. D. #1	Well	0.08	0.05	0.07	0.10	Wells
W. D. #2	Well	0.588	-	0.26	0.66	

TABLE III-7
Self-Supplied Industrial Water Systems
Coastal Zone Area
Columbia County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (MGD)*	Projected Demand (MGD)**: 1970	1990	2020	Alternatives to Meet Future Needs
Lone Star Cement	Hudson R. Cleverack Cr.	0.28	0.4	0.7	1.7	
Universal Atlas Cement	Hudson R.	0.45	0.6	1.1	2.7	
COLUMBIA COUNTY TOTAL**		2.70	3.4	6.6	16.4	

* 1965 withdrawal
** County Total Estimated in TAMS Recon. Report Proportioned to Nearest 0.1 MGD



Columbia County
Water Supply System
CZM Water Supply Study
Figure III-4

Ulster County

The county is located on the westerly bank of the Hudson River about halfway between New York City and Albany. The major employers are manufactures of electronic equipment, apparrel and textiles.

The western portion of the county drains southwesterly into the Delaware River. The eastern portion drains easterly into the Hudson River via Esopus Creek, Rondout Creek and several minor tributaries. The bedrock beneath the coastal zone area consists of slate and metamorphic shale overlain with deposits of glaciated drift.

Municipal Water Systems

The county has 26 public water supply systems, nine of which provide water to the coastal zone. Two systems use the Hudson River. Ground water is used by 18 systems within the county or 4 systems within the coastal zone. Surface water sources are used by 8 systems within the county or 3 within the coastal zone. Within the county, 2 systems purchase water from other systems. Of these, only Glasco Water District is located within the coastal zone. The water systems within the potential coastal zone are listed in Table III-8 and are described briefly below.

Saugerties Water District

The Village of Saugerties takes its water from Blue Mountain Reservoir on Prattekill Creek. The village in turn sells part of its water to the Glasco Water District. The estimated yield of the system is 1.8 MGD. CPWS-15 recommends that this system be combined into a larger system taking water from the Catskill Aqueduct near Stone Ridge. Alternative regional systems considered the Hudson River or the Prattekill Creek as a source.

Glasco Water District

The District receives its water from the Saugerties water district, described above. Its estimated withdrawal capacity is 0.50 MGD. CPWS-15 recommends that this system be part of the system using the Catskill Aqueduct. Alternative regional systems considered the Hudson River or Prattekill Creek as a source.

Kingsvale Water Company

This company isn't described in detail except that it uses well capable of producing an estimated 0.18 MGD, which appears adequate to meet projected needs.

Town of Ulster Water District

This District obtains its water from a well near Esopus Creek. The yield of the well is estimated at 0.43 MGD. CPWS-15 recommends that this District be part of the system using the Catskill Aqueduct. Alternative regional system considered the Hudson River and Prattekill Creek as a source.

City of Kingston

The City diverts water from Mink Hollow Creek into the Cooper Lake storage area. The source has an estimated safe yield of 6.1 MGD. The projected demands for 2000 for the City are within the safe yield of the system. However, the projected demands for the smaller systems surrounding the city exceed the capacity of the combined systems even if they were interconnected. CPWS-15 recommends that the city join the combined system using the Catskill Aqueduct. Alternative regional systems considered the Hudson River and Prattekill Creek as a source.

Port Ewen Water District

The District diverts water from the Hudson River through a treatment plant having a capacity of 0.5 MGD. The system is supplemented by a well located near Plantasie Creek. The system is inadequate to meet projected demands. CPWS-15 recommends that this system be part of the system using the Catskill Aqueduct. Alternative regional systems considered the Hudson River and Prattekill Creek as a source.

Highland Water District

The District takes water from the Hudson River through a treatment plant with a capacity of 1.0 MGD. The system is inadequate to meet projected demands for 2000. CPWS-15 recommends that the District expand its plant to meet projected demands. Other alternatives were to expand the plant to meet demands for two districts to the south or to join these districts in using the Delaware Aqueduct.

Milton Water District

The District is supplied by wells capable of yielding 0.15 MGD. The system is inadequate to meet projected demands. CPWS-15 recommended that the District be part of a combined system using the Delaware Aqueduct. An alternative considered joining an enlarged system using the Hudson River at the Highland Plant.

Marlboro Water District

The District takes water from a reservoir west of the village and a well field along the Hudson River. The system is inadequate to meet projected demands. CPWS-15 recommends that the District be part of system using the Delaware Aqueduct. An alternative considered joining an enlarged system using the Hudson River at the Highland Plant.

Self Supplied Industrial Water Systems

The TAMS study reported seven industrial water users. Three of these are self supplied by well, but do not appear to be within the coastal zone area.

Boundary Line Determination

No major aquifers are located near the coastal zone area. The Marlboro and Port Ewen Water Districts as well as the Kingsvale Water Company take minor amounts of water from the ground. The exact location of these are not shown in CPWS-15, but they could be a determining factor.

Areas of Protection

In addition to the three areas above, two existing intakes could need protection. One of the alternative considerations to the recommended plan was a intake along the Hudson at a different location. Preservation of this area could be considered.

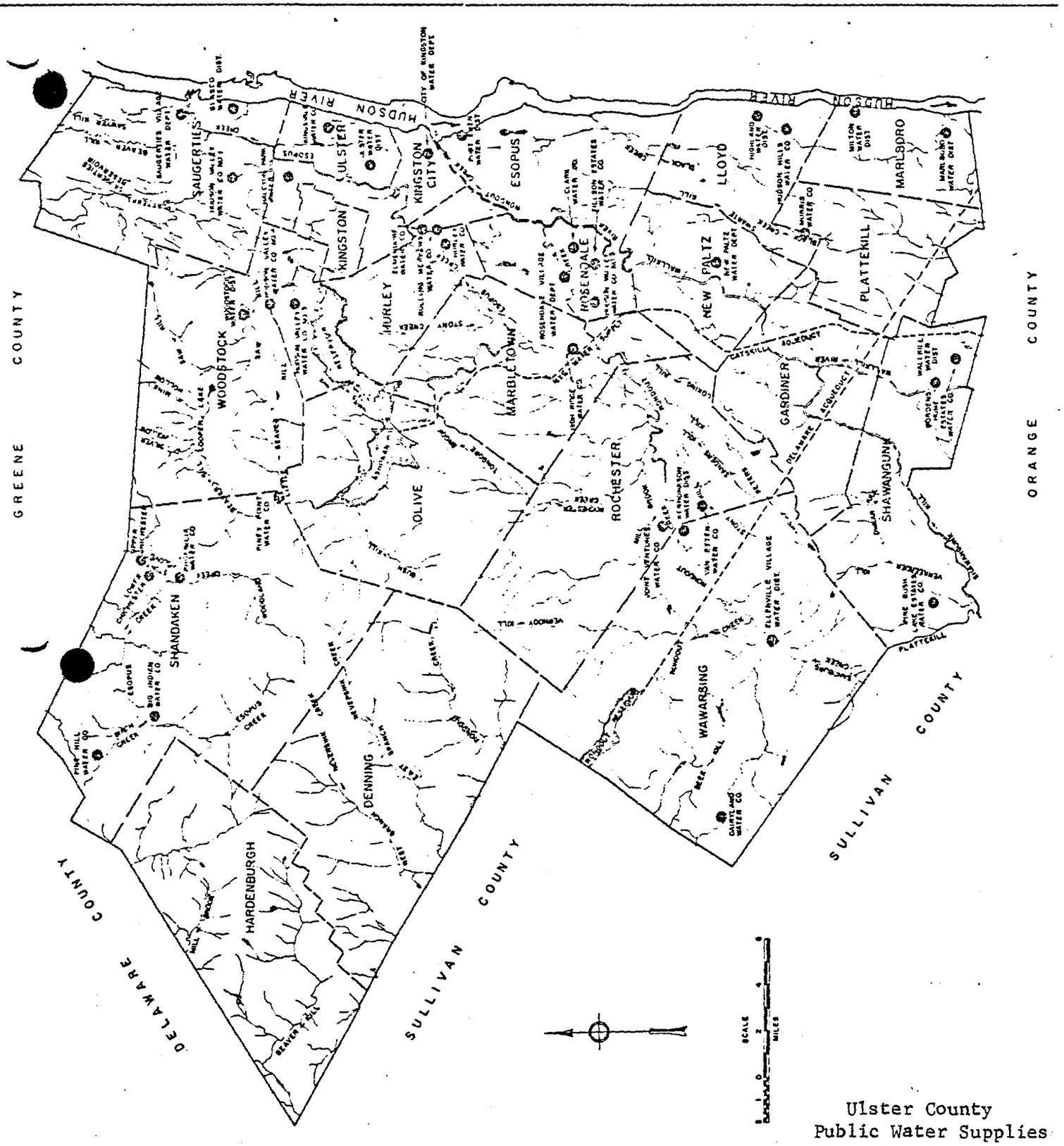
TABLE III-8

Existing Public Water Supply Sytems
Coastal Zone Area

Ulster County

Water System	Existing Sources & Capacity: Sources	System Capacity (MGD)	Projected Demand (MGD): 1970	1985	2000	Alternatives To Meet Future Needs
Saugerties W.D.	Prattekill Cr.	1.80	0.50			1. Catskill Aqueduct
				2.64	3.44	2. Hudson River
Glasco Water Co.	Saugerties	0.50	0.30			3. Prattekill Creek
Kingsvale Water Co.	Wells	0.18	0.30			NONE
				1.76	2.96	
Town of Ulster W.D.	Wells	0.43	0.25			a
Kingston (C)	Mink Hollow Cr.	6.10	4.00	4.80	4.88	a
Port Ewen W.D.	Hudson River well	0.50	0.30	1.20	1.60	a
Highland W.D.	Hudson River	1.00	0.75	1.20	1.60	1. Hudson River 2. Delaware Aqueduct
Milton W.D.	Wells	0.15	0.05			1. Delaware Aqueduct
				0.77	1.00	
Marlboro W.D.	Reservoir Wells	0.35	0.20			2. Hudson River

a - Part of regionalized system with Saugerties



Ulster County
Public Water Supplies
CZM Water Supply Study
Figure III-5

Dutchess County

Dutchess County is located about halfway between Albany and New York City along the easterly bank of the Hudson River. Its primary economic activity is associated with the machinery industries as well as the printing and publishing industries.

The eastern quarter of the county is drained by Tenmile River into Connecticut. The remainder drains into the Hudson River via Wappinger Creek, Fishkill Creek and several smaller tributaries.

Most of the potential coastal zone area is underlain by the Hudson River Formation, which is not generally classified as an aquifer. There are two strips of Stockbridge Limestone south of Poughkeepsie, which have a higher yield. Surficial deposits along the stream valley beds could also be considered as aquifers.

Municipal Water Systems

In August 1962, the county adopted a master plan for the establishment of the Dutchess County Water District including communities within the potential coastal zone. At that time, 24 water districts and 16 privately owned systems were to be included in the District. The plan called for a phased interconnection of water systems, an expansion of the City of Poughkeepsie's treatment plant on the Hudson River and the development of an impounding reservoir on Little Wappinger Creek by about 1985.

Subsequently, the City of Poughkeepsie, the villages of Fishkill and Rhinebeck as well as the town of Rhinebeck withdrew their support for the plan resulting in the 1965 version of the Master Plan, which changes some transmission lines and constructs a new treatment plant along the Hudson River.

In addition, other studies of the New York City water supply problem recommend that New York City take water from Hyde Park and transport it via an aqueduct to Kensico Reservoir in Westchester County. If this occurs, Dutchess

County will probably tie into the New York City system.

A brief description of the larger water systems in the potential coastal zone follows. Table III-9 lists all the water districts in the potential coastal zone.

City of Poughkeepsie

The City takes its water from the Hudson River. The treatment plant has a capacity of 12 mgd. At present the City also serves 23 water districts within the town of Poughkeepsie.

City of Beacon

The City has three small reservoirs called Cavgill, Beacon, and Melzingah. In addition, a well is used as an emergency source. The entire system is capable of producing 23 mgd and supplies 3 water districts in the town of Fishkill.

Wappinger Falls Village

The village also provides water service to Swenson Estates Water District. The supply is obtained from three wells with an estimated capacity of 1.32 mgd. Hardness is a problem and a portion of the water (up to 0.36 mgd) is softened.

Hyde Park (Unincoporated)

The Hyde Park Fire and Water District obtains its water from Crum Elbow Creek. Two auxiliary wells have also been developed. The estimated capacity of the system is 1.15 mgd. The service area includes three federal institutions plus two water districts.

Rhinebeck Village

The system serves the village and Rhinecliff Hamlet. The sources of supply are 4 wells which have an estimated capacity of 0.34 mgd. Landman Kill is used as an emergency source of water supply.

Fishkill Village

The village serves one other district and an unincorporated area outside the village. The main sources of supply are 4 wells which have an estimated

yield of 1.06 mgd. In addition, the village has a standby supply consisting of reservoirs on Hell Hollow Brook and Clove Brook, which have an estimated yield of 0.06 mgd.

Red Hook Village

The village sources of supply are 4 wells, which have an estimated yield of 0.125 mgd.

Tivoli Village

The village sources of supply are 4 wells, which have an estimated yield of 0.10 mgd.

Self-Supplied Industrial Systems

The TAMS study reported five industries that have their own systems. One of these uses the Hudson River as a source. Table III-10 lists the industry with its projected demands.

Boundary Line Determination

From a water supply standpoint, the location of the coastal zone boundary line is not critical. If the recommended plan comes true the western third of the county would be interconnected.

Areas of Protection

Areas of protection could be the existing and proposed water intakes and the aquifers. The existing intake for Poughkeepsie can be located, but it is uncertain which proposal will be used in the future. The alternatives are expansion of the Poughkeepsie intake, a new county intake location or the Hyde Park aqueduct for the City of New York.

TABLE III-9

Existing Public Water Supply Systems
Coastal Zone Area
Dutchess County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (mgd)	Projected Demand (mgd): 1980	Projected Demand (mgd): 1990	Projected Demand (mgd): 2020	Alternatives to Meet Future Needs
BEACON CITY Glens Park Beacon Hills W.D. Matteawan Hospital	Reservoirs & wells	2.30	2.24	2.86		(a)
FISHKILL TOWN Brinkerholf Water Co. Fishkill Park Apt. Hudson View Water Works Pleasant Manor	wells	0.88	2.52	4.00		(a)
FISHKILL VILLAGE Glenham Water Dist.	wells	0.80	0.17	0.23		(a)
HYDE PARK Dutchess Estates Harbourd Hills Water Co. Haviland Apts. Hyde Park Fire & Water Dist. KiFi Apts. South Cross Rd. Water Co. Staatsburg Water Co.	Crum Elbow Cr. & wells	2.04	3.22	4.58		(a)

TABLE III-9

Existing Public Water Supply Systems
Coastal Zone Area
Dutchess County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (mgd)	Projected Demand (mgd): 1980	Projected Demand (mgd): 1990	Projected Demand (mgd): 2020	Alternatives to Meet Future Needs
POUGHKEEPSIE CITY	Hudson River	12.00	5.60	7.15		(a)
Arlington						
Bradley Village						
Carriage Hill						
Coral						
Crestwood Heights						
Crestwood Heights Ext. 1						
Crestwood Heights Ext. 2						
Croft Road						
Crown Heights						
Crown Heights Ext.						
Eastwood						
Hagan Farms						
Kingwood Park						
Pye Lane						
South Gates Estates						
South Park Estates						
South Park Estates Ext. 1						
South Park Estates Ext. 2						
Spackenkill Heights						
Spackenkill Heights Ext.						
Tower Development						
Walnut Hill						
Woodmere Park						

TABLE III-9

Existing Public Water Supply Systems
Coastal Zone Area
Dutchess County

Water System	Existing Sources & Capacity: Sources	System Capacity (mgd)	Projected Demand (mgd): 1980	1990	2020	Alternatives to Meet Future Needs
POUGHKEEPSIE TOWN Centerbury Gdn. Apts. Colburn Estates Country Club Estates Country Club Terrace Apts. Lincoln Merrywood Pine Acres Pleasant Ridge Estates Riverview Village Sharon Heights Sharon Heights Ext. Sunny Slopes Swenson Estates Valley Acres	wells	0.72	8.40	11.15		(a)
RED HOOK TOWN Annadale Water Works, Inc. Rokeby Gardens Windmere Highland Water Co.	wells	0.48	0.98	1.43		(a)
RED HOOK VILLAGE	wells	0.25	0.28	0.34		(a)

TABLE III-9

Existing Public Water Supply Systems
Coastal Zone Area
Dutchess County

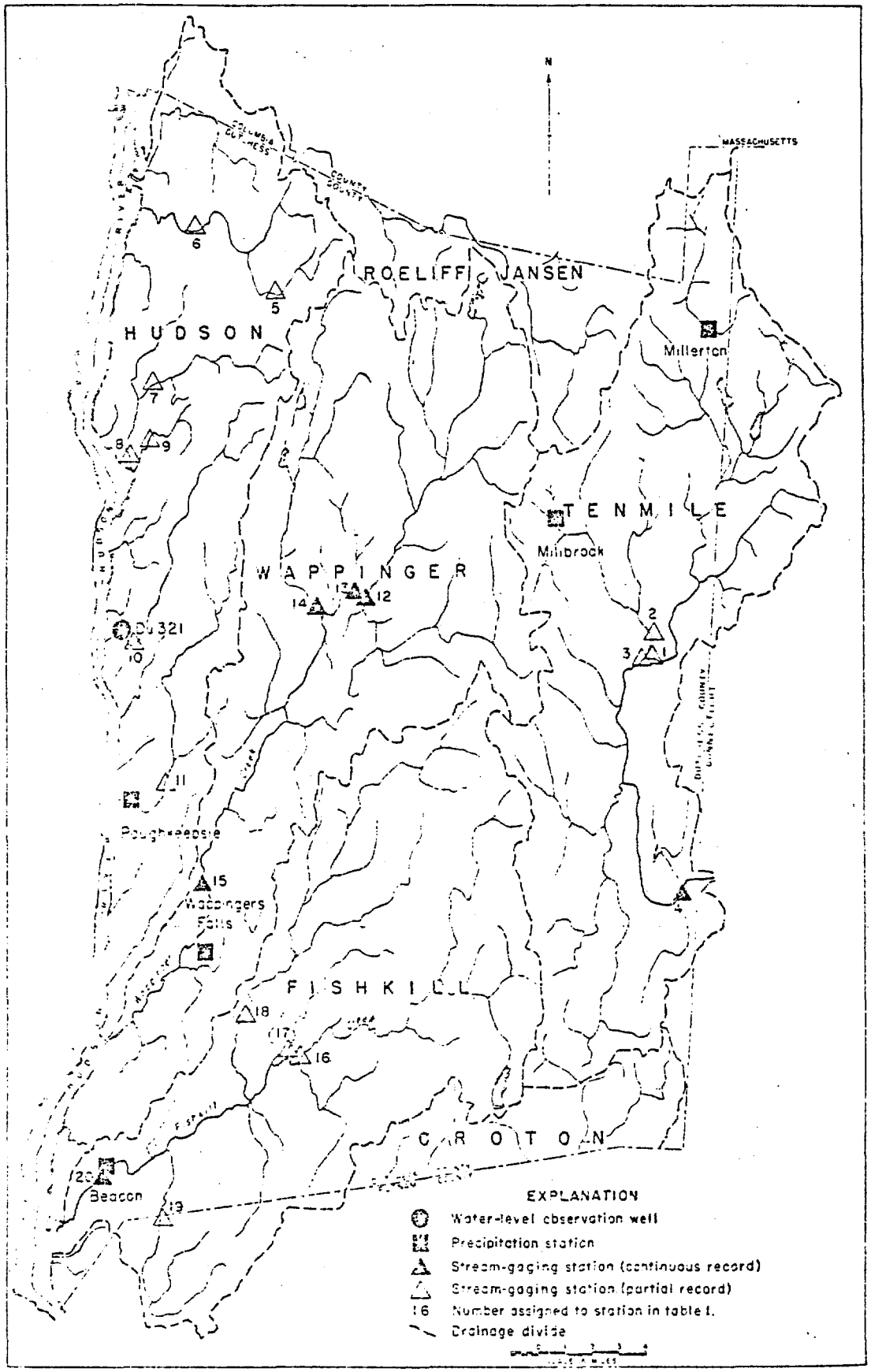
Water System	Existing Sources & Capacity: Sources	System Capacity (mgd)	Projected Demand (mgd): 1980	1990	2020	Alternatives to Meet Future Needs
RHINEBECK TOWN		0	0.56	0.77		(a)
RHINEBECK VILLAGE	Hudson River	1.00	0.36	0.46		(a)
TIVOLI VILLAGE	wells	0.11	0.13	0.14		(a)
WAPPINGER TOWN Atlas Water Co. Chelsea Ridge Apts. Fleetwood Manor Gerion Apts. Hilltop Water Co. Mayim Water Co. Montclair Apts. Oakwood Knolls Water Dist. Orchard Homes Rockingham Farms Royal View Apts. Scenic Apts. Tall Trees Wappinger Park Homes	wells	2.68	3.92	5.51		(a)
WAPPINGER FALLS VILLAGE	wells	1.08	0.90	1.07		(a)

(a) Interconnection of all districts was recommended first followed by use of the Hudson River

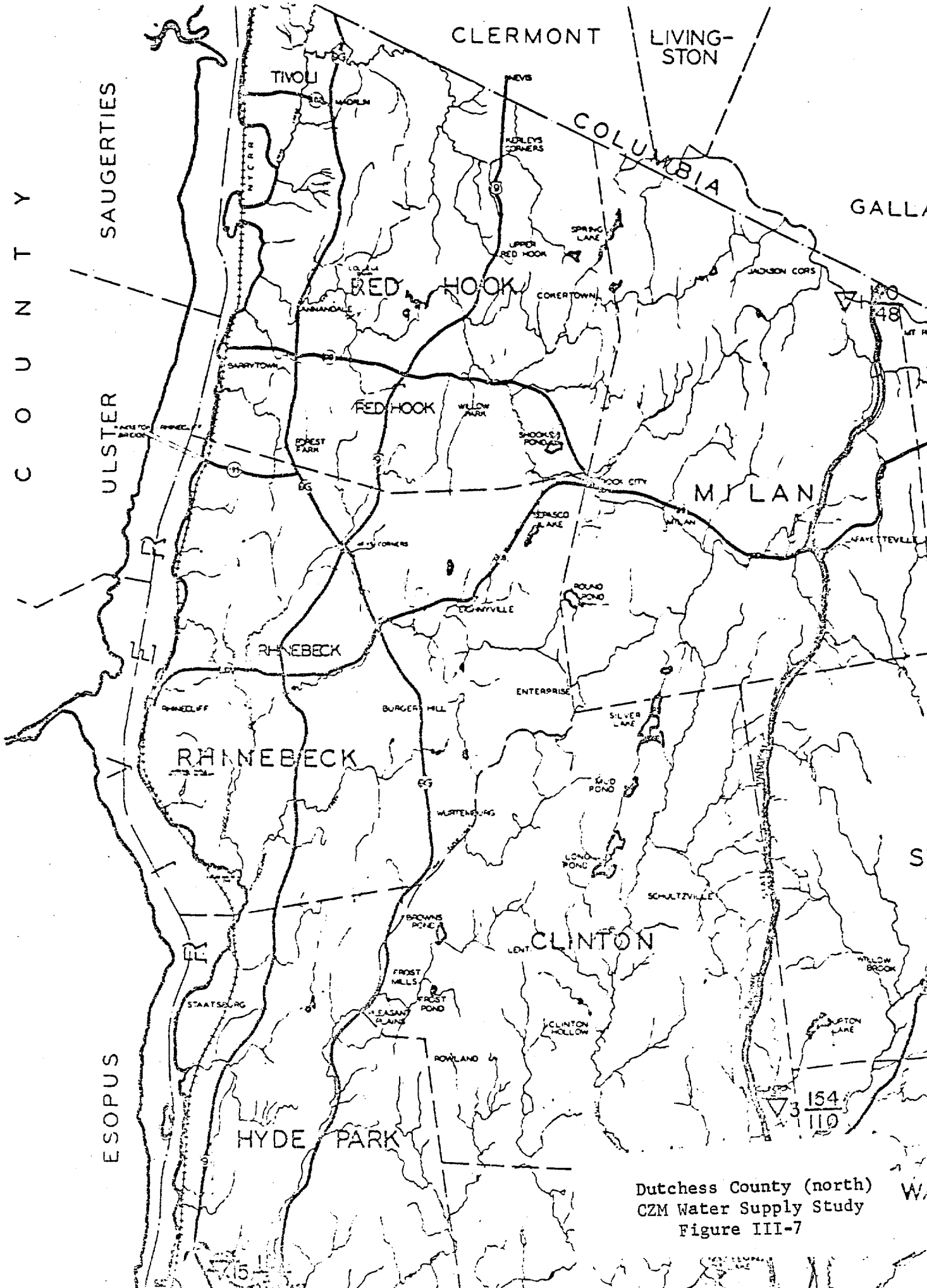
TABLE III-10
Self-Supplied Industrial Water Systems
Coastal Zone Area
Dutchess County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (MGD)*	Projected Demand (MGD)**: 1970	1990	2020	Alternatives to Meet Future Needs
IBM - Poughkeepsie	Hudson R.	24.00	31.7	80.0	267.0	
DUTCHESS COUNTY TOTAL**		25.71	34.0	85.7	286.0	

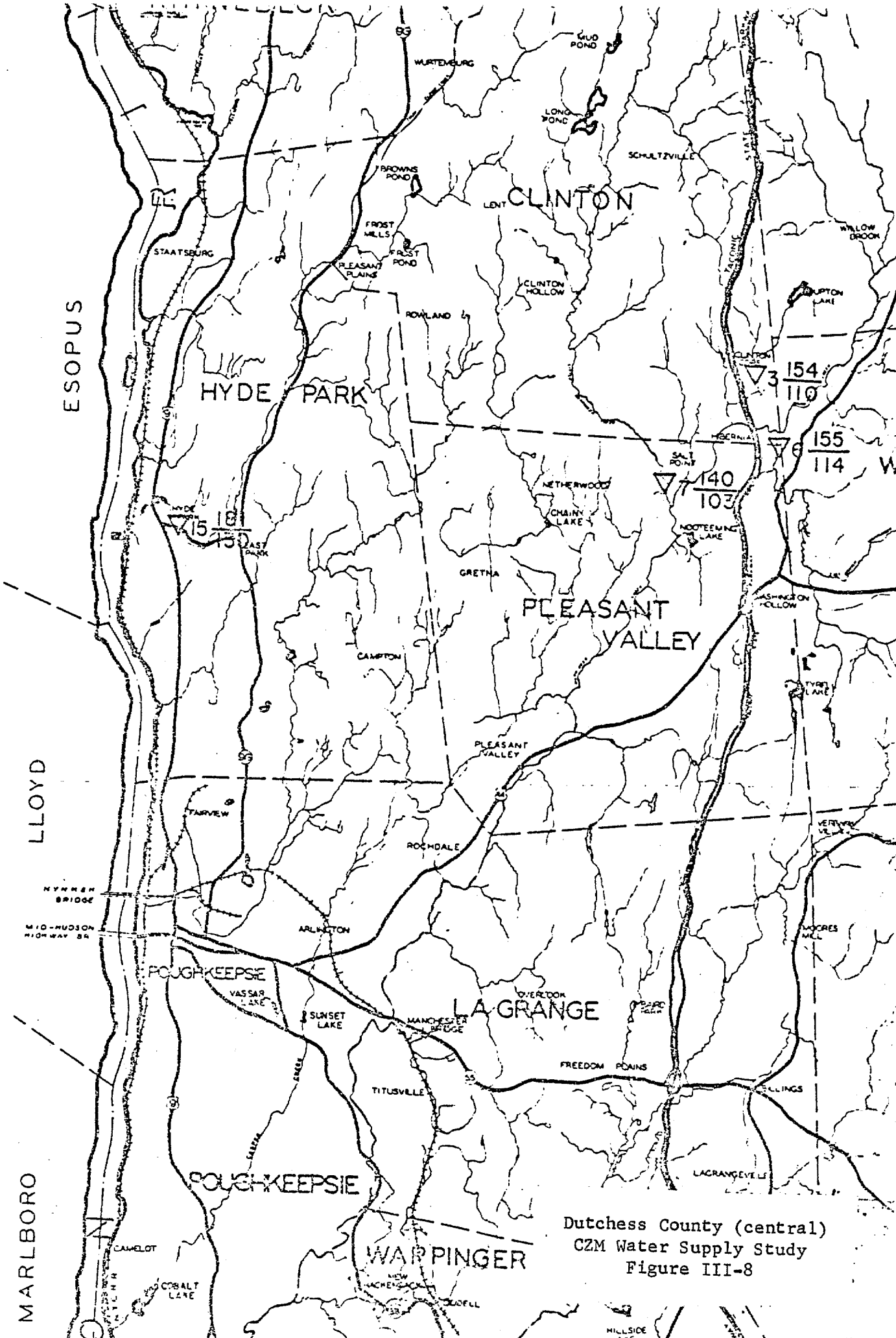
* 1965 withdrawal
** County Total Estimated in TAMS Recon. Report Proportioned to Nearest 0.1 MGD



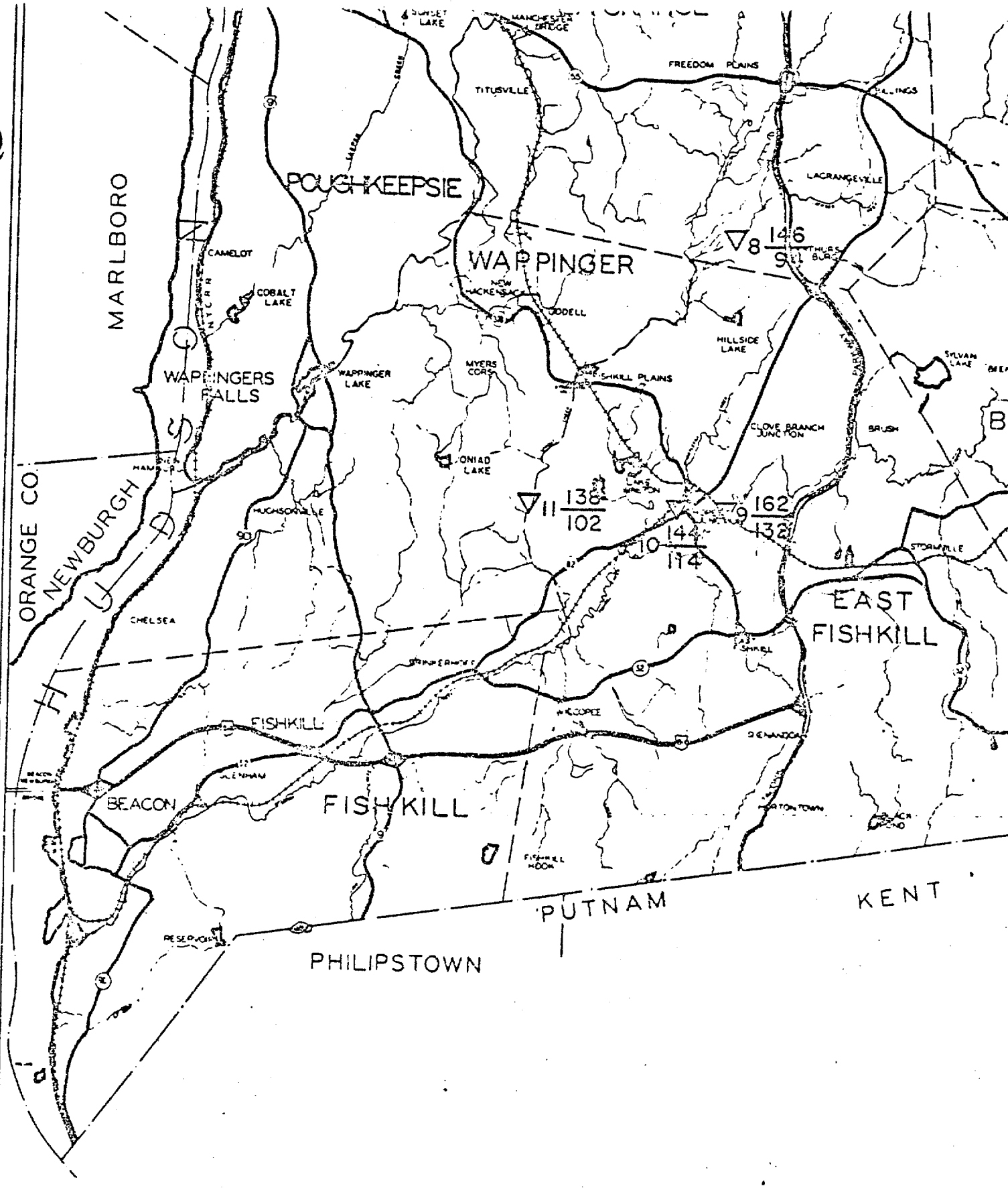
Dutchess County
Drainage Basins
CZM Water Supply Study
Figure III-6



Dutchess County (north)
CZM Water Supply Study
Figure III-7



Dutchess County (central)
CZM Water Supply Study
Figure III-8



Dutchess County (south)
CZM Water Supply Study
Figure III-9

Orange County

Orange County is located along the west bank of the Hudson River with its center about 50 miles from New York City. Employment at present comes mainly from agricultural pursuits. However, projected future growth is expected from business activities associated with urbanization.

The county drains into three major watersheds. The western portion drains into the Delaware River. The southern part drains into the Ramapo River, a Passaic River tributary. The remainder of the county drains into the Hudson River via the watersheds of Wallkill Creek, Moonda Creek or other minor tributaries.

No major aquifers are located in the potential coastal zone area. The bedrock formation of carbonate rocks, shale and crystalline rocks produce low yielding wells. Only one higher yielding aquifer from the surfacial glaciated deposits occurs near Moodna Creek. The estimated yield is in excess of 1 MGD, but the presence of manganese causes a water quality problem.

Municipal Water Systems

Six of the twenty-seven municipal water supply systems in Orange County are within the possible coastal zone area. Groundwater is used as a source for all or part of their supply for 15 municipal systems or two systems within the coastal zone. Surface sources provide part or all the water supply for 17 systems of which five are within the coastal zone. The Village of Cornwall (within the coastal zone) also uses the Catskill Aqueduct for an emergency source of supply. Table III-11 lists the municipal water supply systems within the potential coastal zone area which are described briefly below.

Newburgh Consolidated Water District

In 1966, the District was formed integrating numerous community and private systems and developing Chadwick Lake as a source. The estimated safe yield of

the source is 4.9 MGD. CPWS-4 considered three alternatives which included using the Delaware Aqueduct, raising the Chadwick Lake dam and using flood skimming techniques from neighboring Gidneytown Creek.

City of Newburgh

The City's sources of water supply are from the drainage basins of Patton Brook, Silver Creek and Washington Lake. In 1854, Lake Washington was developed as a water supply source after groundwater sources became inadequate. As demands increased, Lake Washington was raised; diversions were made into Lake Washington from Patton Brook and Silver Stream; and then Silver Stream Reservoir (Brown's Pond) was constructed upstream from the diversion. Lockwood Basin immediately downstream from Lake Washington catches the overflow from the Lake, and is used as an emergency source. In 1919 and in 1965, water was diverted from the Catskill Aqueduct into Silver Stream. The existing system has an estimated yield of 3.8 MGD. CPWS-4 recommends that a supplemental supply be obtained by making a diversion from Drury Lane Creek to Washington Lake and a permanent connection to the Catskill Aqueduct.

Town of New Windsor

The Town's water supply is groundwater obtained from three well fields having a combined yield of 1.0 MGD. A caisson well located near Moodna Creek fluctuates with the tidal flows of the Hudson River, but tests show that the water quality is nearer to that of Moodna Creek. The Schoonmake well and the Little Falls Pond well field (5 wells) are drilled at different locations and are not subject to the tidal flows of the Hudson River. Part of the system is interconnected with the City of Newburgh. CPWS-4 considered either purchasing water from the City of Newburgh or becoming part of a larger system using the Catskill Aqueduct as a source.

Village of Cornwall

CPWS-4 is dated in regards to this system. The village has three general sources, which are the Black Rock Forest System, the Mountainview Well System

and the Catskill Aqueduct Supply. The safe yield of the entire system is 3.0 MGD. The Black Rock Forest System consists of Aleck Meadow Reservoir, Authur Pond, Sphagnum Pond, Tamarack Pond, and Upper Reservoir. Consolidated Edison was to flood out the Upper Reservoir for their pumped storage hydroelectric project. The mountainville well system consists of two wells along Moodna Creek. The village is restricted to a maximum withdrawal of 1 MGD due to the use of the aquifer for irrigation by Glenoden Farms and Star Industries. The Catskill Aqueduct was a new connection in 1967. CPWS-4 considered various alternatives using the Catskill Aqueduct as a source for the village.

Village of Highland Falls

The village obtains its water from two reservoirs on Highland Falls Creek also known as Buttermilk Falls Brook. Water is released from the two reservoirs, Bog Meadow Pond and Jim's Pond, to an intake downstream. The yield of the system is estimated as 0.5 MGD. CPWS-4 recommends purchase of water from the West Point System or the development of a reservoir on Glycerine Hollow Brook.

West Point

The United States Military Reservation at West Point takes water from the Popolopen Brook and Queensboro Brook Watersheds. The yield of the system is estimated as 4 MGD. Although there are several lakes within the watershed, only Stilwell Lake on Popolopen Brook is used as a source for the Academy. Some of the lakes on Queensboro Brook are used by the Palisades Interstate Park. The planned expansion of the Academy (1967) included additional treatment facilities using Stilwell Lake as its source.

Self Supplied Industrial Systems

The TAMS study listed seven self supplied industrial water users. Of these only one appears to be located with the possible coastal zone and is summarized in Table III-12.

Boundary Line Determination

Nearly all sources are located outside the potential coastal zone. The aquifer along Moodna Creek might be considered. The exact location or extent of the wells aren't known by the writer. Other than that the location of the boundary line doesn't appear important.

Areas of Protection

The recharge areas along Moodna Creek appear likely for protection. In addition, the area in the vicinity of the industrial water intake may require protection. The results of the field survey discussed in Section VI and the subsequent evaluation determined that existing laws provide sufficient protection for these areas.

TABLE III-11

Existing Public Water Supply Systems

Coastal Zone Area

Orange County

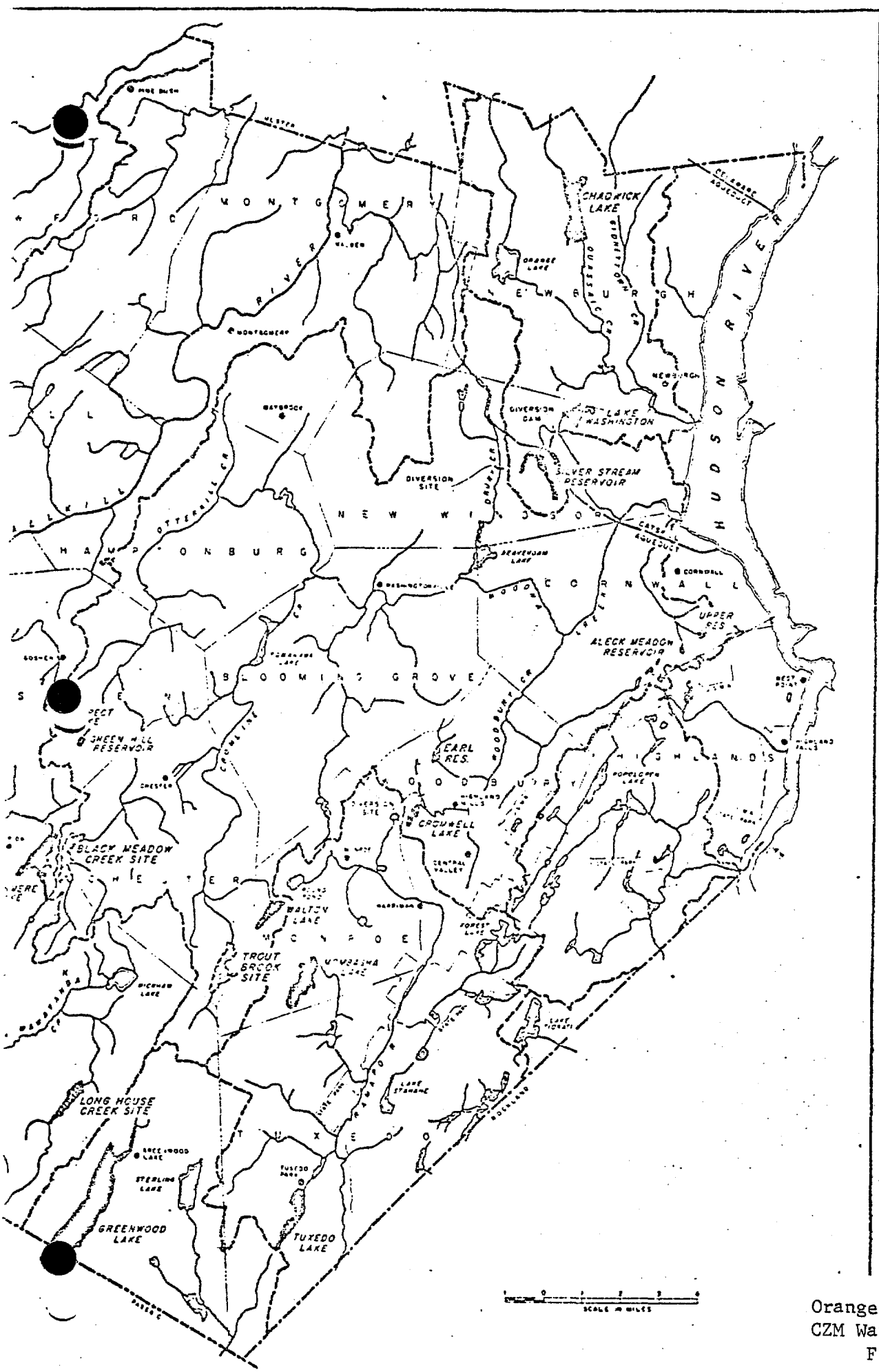
Water System	Existing Sources & Capacity: Sources	System Capacity (MGD)	Projected Demands (MGD): 1965	1995	2020	Alternatives to Meet Future Needs
Newburgh Consolidated Water District	Chadwick Lake	4.9	0.4	6.4*	10.8*	Chadwick Lakes Expansion Catskill Aqueduct Gidneytown Creek
Newburgh (C)	Patton Brook Silver Stream Washington Lake	3.8	3.6	4.9	6.1	Drury Lane Creek Catskill Aqueduct
New Windsor	Wells	1.0	0.7	6.0*	10.1*	Newburgh (C) System Catskill Aqueduct
Cornwall (V)	Black Rock Forest System	0.73	0.8	3.5	5.8	Catskill Aqueduct
	Wells	1.0				
	Catskill Aqueduct	1.5				
Highland Falls (V)	Highland Falls Brook	0.5	0.4	0.9	1.4	West Point System Glycerine Hollow Brook
West Point	Queensboro Brook Popolopen Brook					

*Table in CPWS-4 appears to be in error for these figures

TABLE III-12
Self-Supplied Industrial Water Systems
Coastal Zone Areas
Orange County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (MGD)*	Projected Demand (MGD)**: 1970	1990	2020	Alternative to Meet Future Needs
Central Hudson Gas & Electric Corp.	Hudson R.	260.00	300	525	900	
ORANGE COUNTY TOTAL**		263.90	309	531	907	

* 1965 Withdrawal
** County Total Estimated in TAMS Recon. Report Proportioned to Nearest MGD



Orange County (partial)
CZM Water Supply Study
Figure III-10

Putnam County

Putnam County is located about 50 miles north of New York City along the easterly bank of the Hudson River. The major economic activity in the county is oriented towards servicing the resident population and vacation resorts. The county could be considered a bedroom community for New York City commuters.

The eastern half of the county drains sourtherly via the Croton River Watershed. The western half drains into the Hudson River via Peekskill Hollow Creek, Canopus Creek, Clove Creek, Fishkill Creek and several smaller tributaries.

The coastal zone area is underlain with crystaline rock which delivers groundwater through cracks and fissures that are difficult to locate. There is a fairly large surficial deposit of glaciated drift located just south of Cold Spring, which could be considered as an aquifer. However, very little subsurface information is available for that area.

Municipal Water Systems

The county has 78 municipal water supply systems. Of these 4 are within the potential coastal zone area. Groundwater is the source for 54 of the systems within the county, but is not in use within the coastal zone. All 4 systems within the coastal zone totalling 21 through the county use surface water as a source. The 4 systems within the coastal zone are listed in Table III-3 and described briefly below.

Cold Spring Water Department

The Cold Spring Water Department supplies water to the villages of Cold Spring and Nelsonville from an intake on Foundry Brook. The overflow from two reservoirs upstream from the intake is sufficient to meet demands during most of the year. Releases are made from the reservoirs in dry periods to meet the demands. The Department has tapped the Catskill Aqueduct on an emergency basis.

CPWS-16 recommended that groundwater be developed to meet future demands after considering a permanent tap to the Catskill Aqueduct and reservoirs on Foundry Brook and Clove Creek.

Highland Public Society, Inc.

The Highland Public Society, Inc. also known as the Garrison Water Supply provides water from a spring developed in 1906. The spring provides an average of 0.002 MGD to the unincorporated area called Garrison. CPWS-16 recommended that this area join the Cold Spring Water Department in developing a source.

St. Basil's Academy

St. Basil's Academy is supplied with an average of 0.01 MGD from Indian Brook. The academy is near the Garrison area. Therefore, CPWS-16 did not evaluate any new sources for this system.

Monastery of Mary Immaculate

The Monastery of Mary Immaculate is supplied with an average of 0.02 MGD from Local Brook. The Monastery is located near the Garrison area. Therefore CPWS-16 did not evaluate any new sources for this sytem.

Self Supplied Industrial Systems

The TAMS Study listed only one self supplied industry, which does not appear to be within the coastal zone.

Boundary Line Determination

Inclusion of the potential aquifer just south of the Village of Cold Spring deserves consideration. Since very little is known about this area geologically due to lack of development, its exact value is unknown.

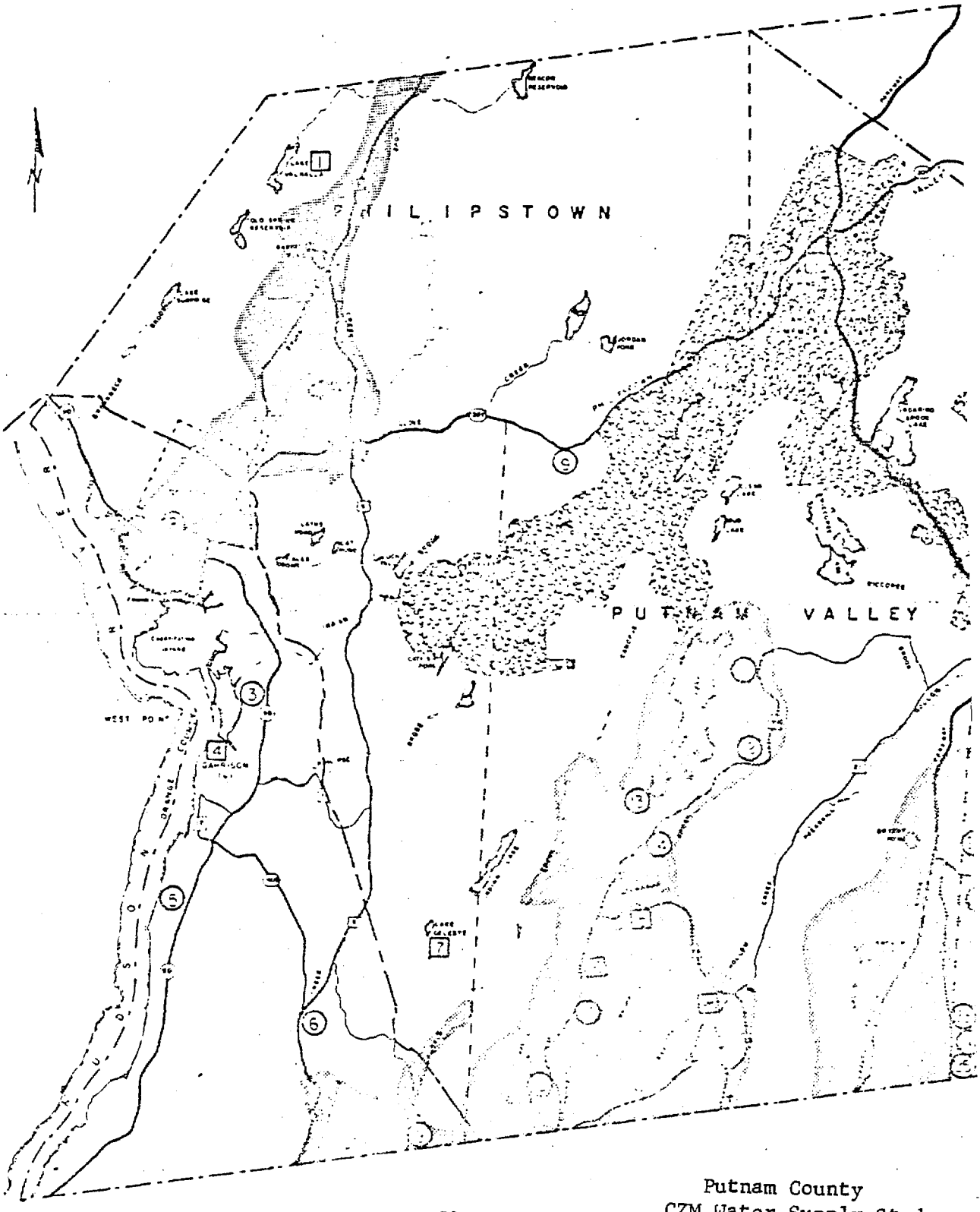
Areas of Protection

The aquifer mentioned above is the only potential area.

TABLE III-13

Existing Public Water Supply Systems
Coastal Zone Area
Putnam County

Water System	Existing Sources & Capacity: Sources	Existing Sources & Capacity: System Capacity (MGD)	Projected Demand (MGD): 1970	1990	2020	Alternatives to Meet Future Needs
Cold Spring Water Dept.	Foundry Brook Catskill Aqueduct	0.16				1. Catskill Aqueduct 2. Groundwater 3. Foundry Brook 4. Clove Creek
Highland Public Society	Spring					1. Groundwater 2. Catskill Aqueduct
St. Mary Immaculate	Local Brook					
St. Basil's Academy	Indian Brook					



Putnam County
CZM Water Supply Study
Figure III-11

Rockland County

Rockland is the most southerly county along the west bank of the Hudson River in New York State. It has become urbanized due to its access to markets in northern New Jersey and New York City via the Thruway and the Tappan Zee Bridge.

The county is drained by three watersheds, the Passaic River to the southwest, the Hackensack River to the south and the Hudson River to the north and east. The major streams draining through the coastal zone area are Minisceongo Creek and Sparkill Creek.

The coastal zone area is underlain by four different types of rock formations of which only the Newark group could be considered an aquifer. In addition, there are surficial deposits of stratified drift which can produce high yielding wells.

Municipal Water Systems

The county has six municipal water supply systems of which two are within the potential coastal zone area. Five systems including both systems within the coastal zone use surface water for part or all of their supply. Three systems including one within the coastal zone use groundwater for part or all of their supply. The systems within the coastal zone are listed in Table III-14 and described briefly below.

Spring Valley Water Company

The Spring Valley Water Company is an investor owned subsidiary of the Hackensack Water Company of New Jersey. The utility's service area includes most of Rockland County. The company has two surface sources, Lake DeForest on the Hackensack River and a reservoir on Cedar Pond Brook. In addition, the Company has 42 wells and springs. The estimated legal yield of the system is 24.65 MGD. The yield of Lake DeForest reservoir is estimated to be over 20 MGD, but court decisions restrict its allowable use to 9.25 MGD.

CPWS-67 recommended the construction of Ambrey Pond Reservoir on Cedar Pond Brook, then the development of more groundwater resources, and then the raising of the DeForest Reservoir.

Nyack Water Company

The Village of Nyack serves the Village and the surrounding towns from an intake along the Hackensack River. The Village has the right to take up to 3 MGD from the River, CPWS-67 could not find an alternate source.

Self Supplied Industrial Systems

The TAMS study listed eight self supplied industrial systems none of which appear to be within the potential coastal zone area.

Boundary Line Determination

With the exception of two of the 42 wells owned by the Spring Valley Water Company, the coastal zone is supplied from outside sources. The line's location appears unimportant.

Areas of Protection

The recharge areas for the well system might be considered if they can be located.

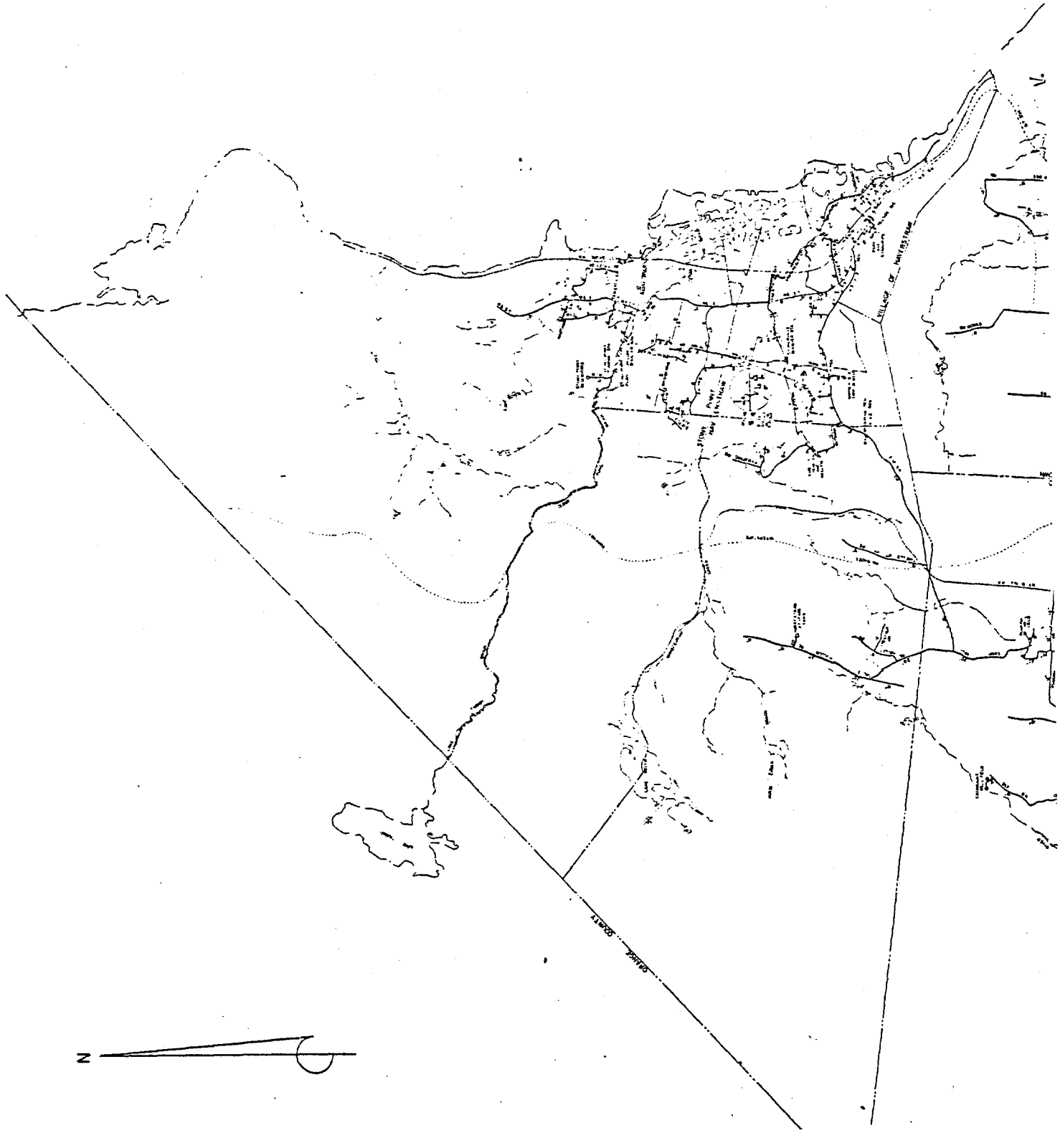
TABLE III-14

Existing Public Water Supply Systems

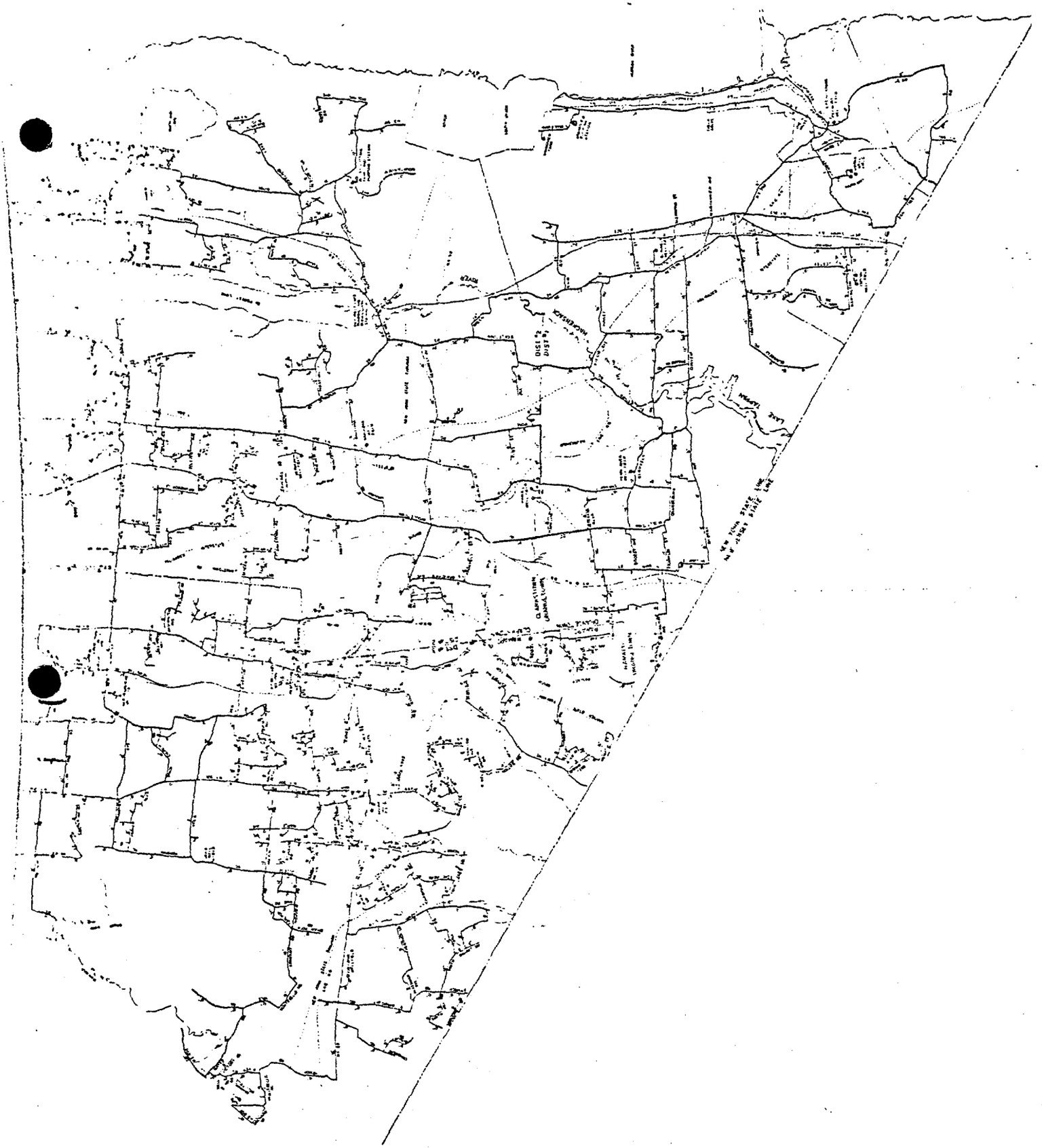
Coastal Zone Area

Rockland County

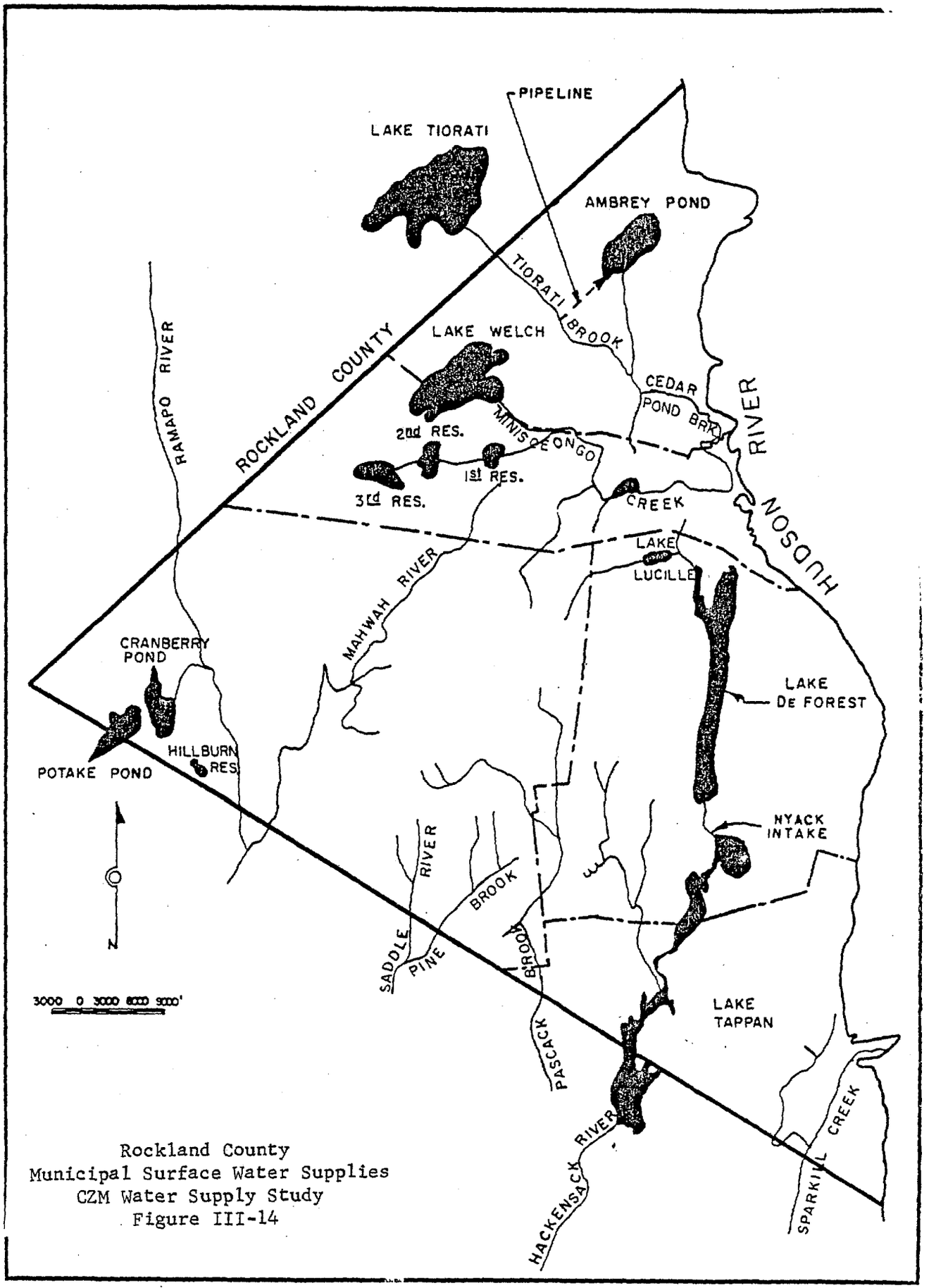
Water System	Existing Sources & Capacity: Sources	System Capacity (mgd)	Projected Demand (mgd): 1966	1985	2020	Alternatives To Meet Future Needs
Spring Valley	Lake DeForest	9.25	14.66	33.0	58.0	Cedar Pond Br. groundwater Lake DeForest Exp. Ramapo River
	Cedar Pond Br.	0.4				
	42 wells & springs	15.0				
Nyack Water Company	Hackensack River	3.0	1.34	2.6	3.3	Hackensack River Expansion



Spring Valley Water Company, Inc. (north)
CZM Water Supply Study
Figure III-12

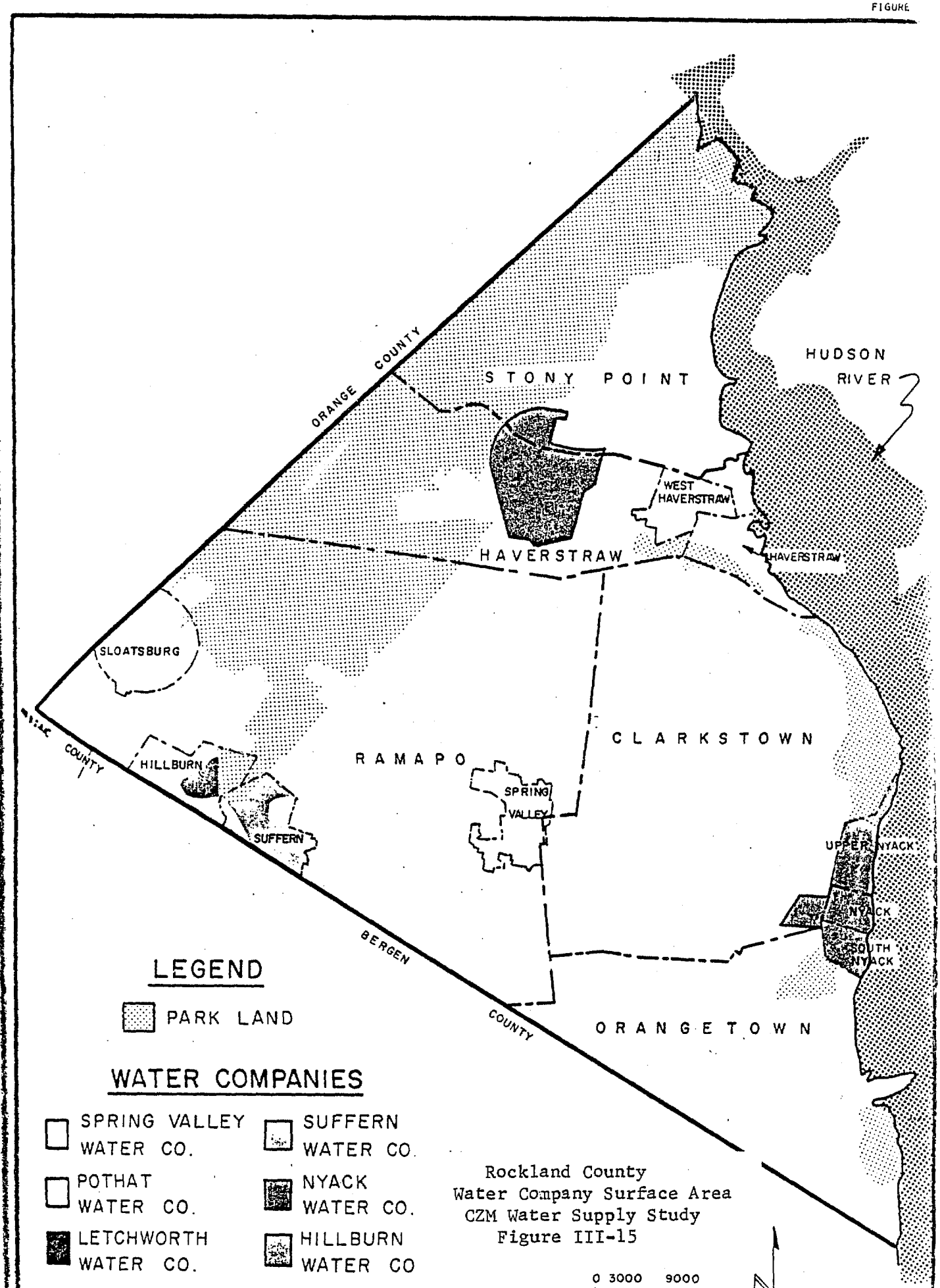


Spring Valley Water Company, Inc. (south)
CZM Water Supply Study
Figure III-13

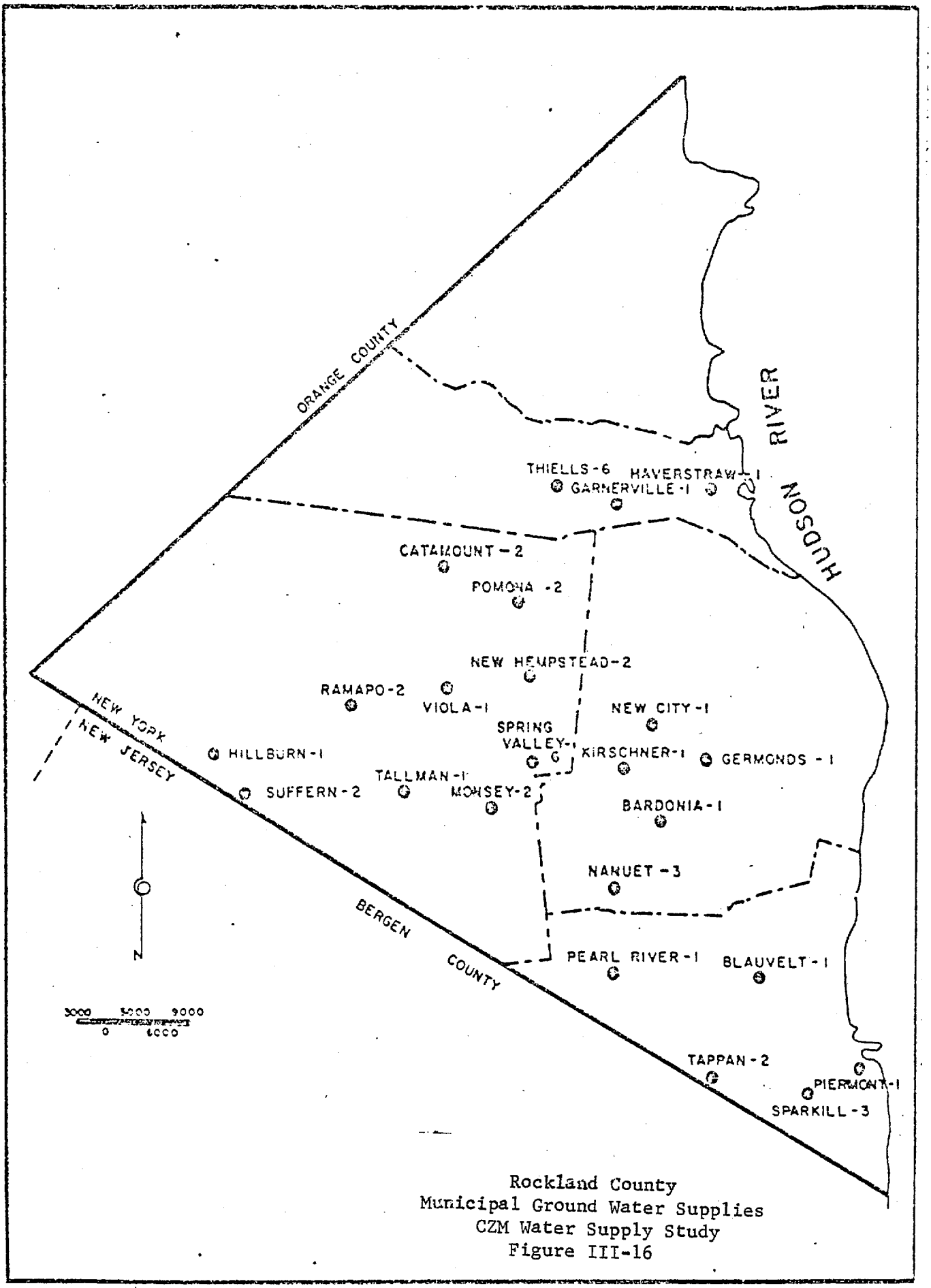


Rockland County
Municipal Surface Water Supplies
CZM Water Supply Study
Figure III-14

FIGURE



Rockland County
Water Company Surface Area
CZM Water Supply Study
Figure III-15



Rockland County
Municipal Ground Water Supplies
CZM Water Supply Study
Figure III-16

Westchester County

Westchester County is located immediately north of New York City, along the east bank of the Hudson River and along the northerly shore of Long Island Sound. The major economic activity comes from services and retail trades since many people commute to New York City.

The northern and eastern portions of the County drain into the Hudson via the Croton River, Peekskill Hollow Brook and other smaller tributaries. The southwesterly portion of the county drains into Long Island Sound.

Municipal Water Systems

Westchester County has 44 water districts or companies. Of these 21 use groundwater sources and 35 use surface sources for part or all of their supply. The water supply system within the potential coastal zone are listed in Table III-15 for the Hudson River reach and in Table III-16 for the Long Island Sound reach. Although detailed descriptions of all of the companies are not available at present, all but the Briarcliff Manor Village system are presently tapping either the Catskill Aqueduct or the Croton River system. It could easily be assumed that the water resources of Westchester County are nearly fully developed.

Self Supplied Industrial Systems

The TAMS study listed only Columbia University out of seven self supplied industries as using the Hudson River as a source. Since no consumptive use was noted no future demand were estimated.

Boundary Line Determination

The county is highly urbanized and is starting to depend on water from the Catskill Aqueduct. The coastal zone area is adjacent to salt water sources, which are not high desirable for water supply purpose. Ground water

sources do not appear to be available in sufficient quantities. The boundary line is unimportant for water supply purpose.

Areas of Protection

Based on the above discussion, there are no areas for protection either

Table III-I5

Existing Public Water Supply Systems
Coastal Zone Area
Westchester County
(Hudson River)

Water System	Existing Sources & Capacity * Sources	System Capacity (mgd)	Projected Demand (mgd) ** 1970	1990	2020	Alternatives to Meet ** Future Needs
Town of Cortlandt						
Cortlandt Water District #1	Catskill Aqueduct					
Croton-on-Hudson (village)	wells	3.22				
Montrose Consolidated Water District	Catskill Aqueduct					
Peekskill City	brook Catskill Aqueduct					
Town of Ossining						
Briarcliff Manor (village)	well	3.5				
Ossining (village)	wells brook Croton System					
Ossining Water Districts						

Table III-15 (Cont'd)

Water System	Existing Sources & Capacity * Sources	System Capacity (mgd)	Projected Demand (mgd) ** 1970	1990	2020	Alternatives to Meet Future Needs **
Town of Mount Pleasant						
Hawthorne Improvement District	Catskill Aqueduct					
North Tarrytown (village)	Croton System					
Old Farm Hill Water District	New Castle Water Co.					
Pleasantville (village)	wells Catskill Aqueduct					
Thornwood Water District	wells Catskill Aqueduct					
Valhalla Water District	Catskill Aqueduct					
Town of Greenburgh						
Elmsford (village)	Catskill Aqueduct					
Greenburgh Consolidated Water District	Catskill Aqueduct					
Irvington (village)	lake Croton System					
Tarrytown (village)	lake Croton System					

Table III-15 (Cont'd)

Water System	Existing Sources & Capacity * Sources	System Capacity (mgd)	Projected Demand (mgd) ** 1970	1990	2020	Alternatives to Meet Future Needs **
Yonkers City	river, reservoir Catskill Aqueduct Croton System					

* Information from TAMS Reconnaissance Study - Complete information not available for individual sources in TAMS or CPWS studies

** Projected demands were made only for regionalized systems in CPWS-10 due to heavy reliance on the New York City system to meet increased future demands

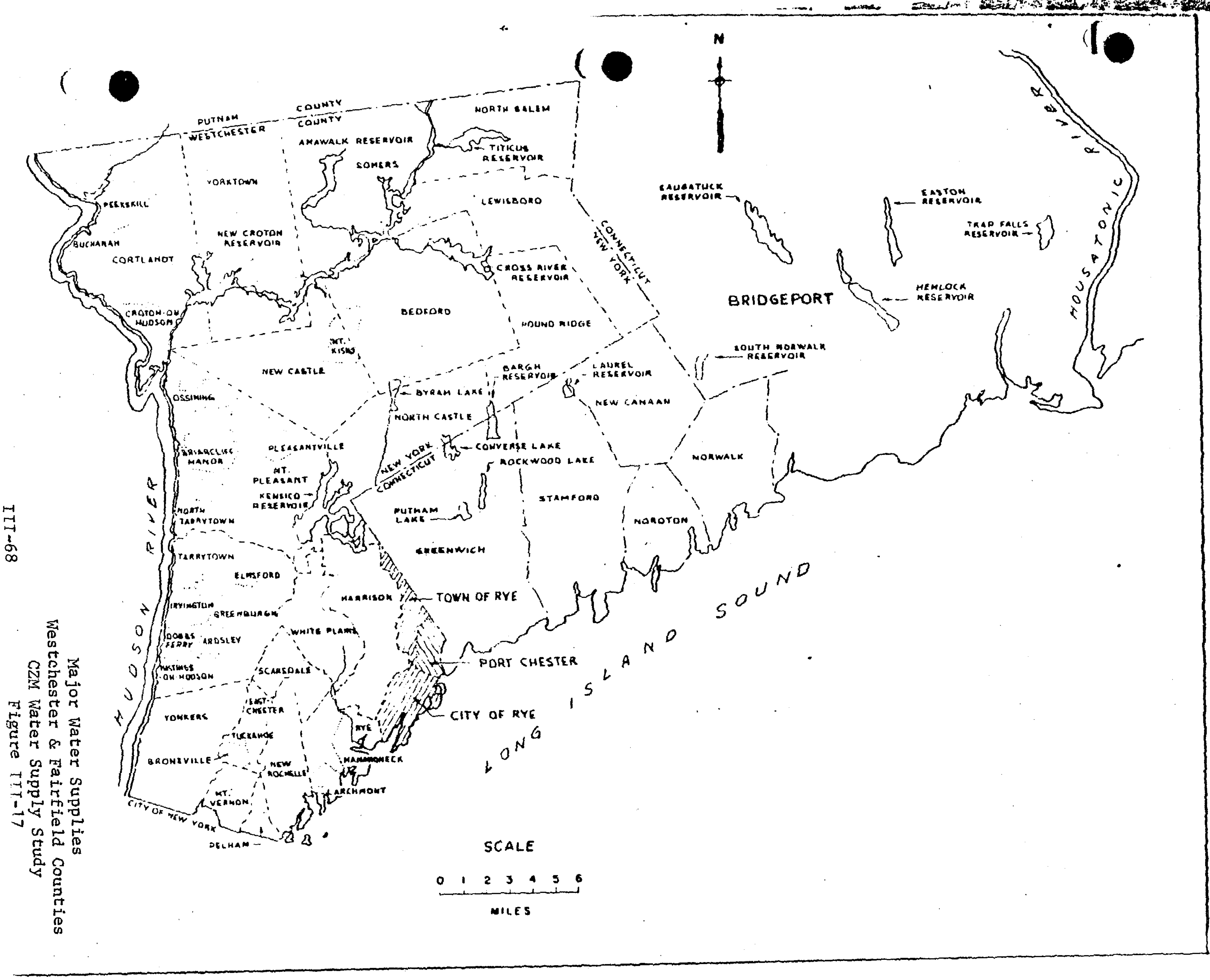
Table III-16

Existing Public Water Supply Systems
Coastal Zone Area
Westchester County
Long Island Sound

Water System	Existing Sources & Capacity* Sources	System Capacity (mgd)	Projected Demand (mgd)** 1970	1990	2020	Alternatives to Meet** Future Needs
Town of Rye						
Port Chester Water Co.	Greenwich Water Co.	7.25 (Legal Limit)				
Town of Mamoroneck						
Larchmong (village)	lake Catskill Aqueduct					
City of New Rochelle						
New Rochelle Water Company	lakes Catskill Aqueduct Croton System					
Town of Pelham						
Pelham (village)	New Rochelle Water Co.					

* Information from TAMS Reconnaissance Study - Complete information not available for individual sources in TAMS or CPWS studies

** Projected demands were made only for regionalized systems in CPWS-10 due to heavy reliance on the New York City system to meet increased future demands



Major Water Supplies
Westchester & Fairfield Counties
CZM Water Supply Study
Figure III-17

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SECTION IV

NEW YORK CITY SUBAREA

GENERAL

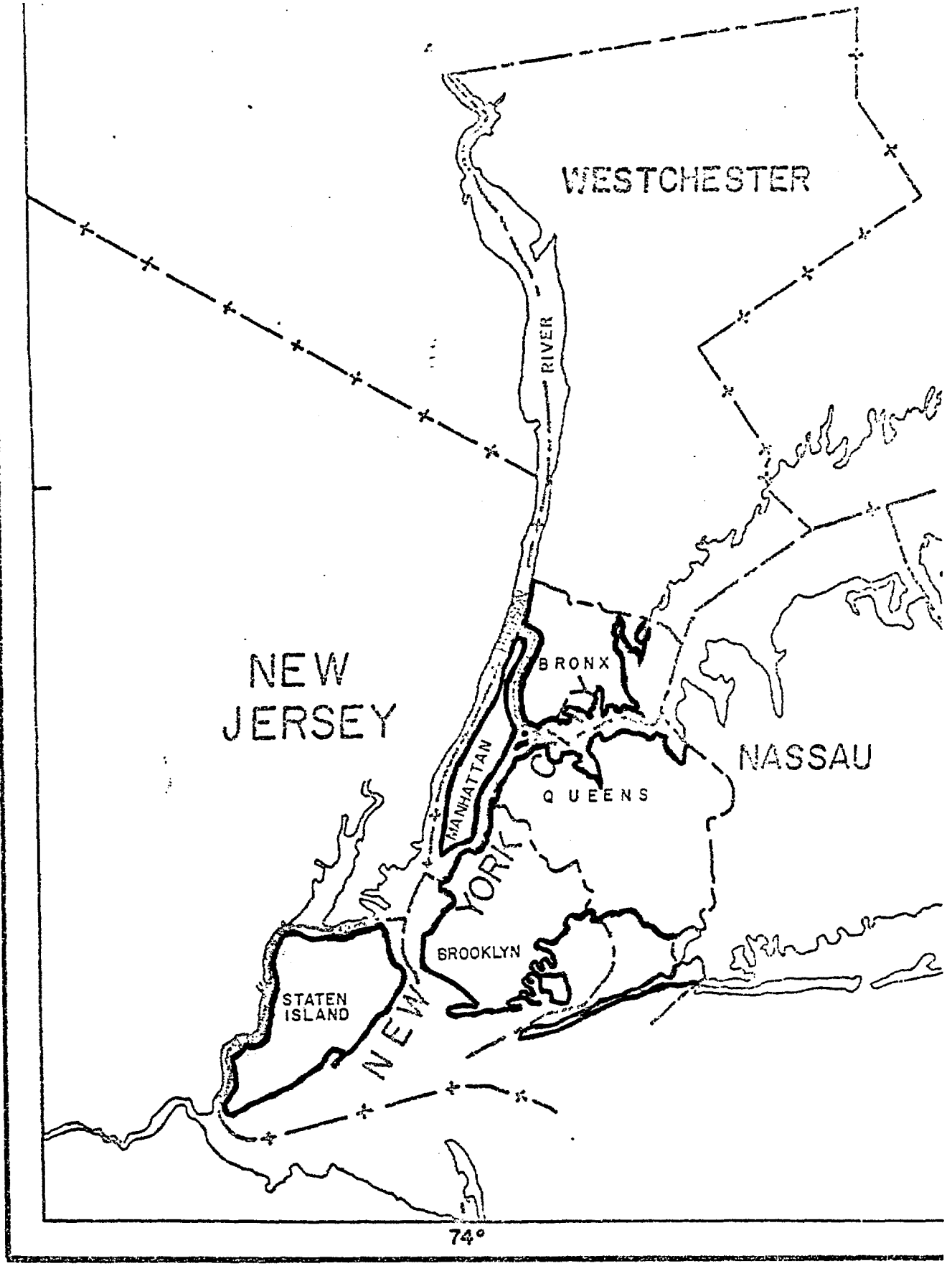
The New York City Sub-Area consists of five boroughs; Bronx, Brooklyn, Manhattan, Queens and Richmond. It includes a small piece of land along the lower Hudson River, portions of the Bronx River Watershed, and the Manhattan and Staten Islands. Present population of the City is estimated at 8,000,000.

Population densities in the four major City boroughs range from 18,000 persons per square mile in Queens to 68,000 persons per square mile in Manhattan. The least developed borough in the City, Richmond also has an average density of 4,500 persons per square mile. The study area is thus one of the most densely populated regions of the Nation. Furthermore, the study area contains the Nation's largest concentration of financial, trade, professional, business and communications services. Therefore, the water supply requirement is by far the most important water problem.

Shoreline extends for more than 100 miles in the sub-area. It includes the coastline along the Atlantic ocean, Long Island Sound as well as the lower reach of the Hudson River. Most of the shoreline has been developed (Figure IV-1).

Existing Public Water Systems

New York City Department of Water Resources serves more than 90 percent of the City's population. It obtains most of its water supply from three upland sources. In addition, the Jamaica Water C ompany (a private water company) uses groundwater to supply water to the City.



City of New York
CZM Water Supply Study
Figure IV-1

New York City Department of Water Resources

Three upland surface supplies provide the backbone of the system (Figure IV-2).

1. Croton River System

The Croton River System is furnished with the runoff from 375 square miles watershed. The system consists of twelve reservoirs with a total storage capacity of about 95 billion gallons. The new Croton aqueduct can yield approximately 275 mgd of water. The safe yield of the system, computed on the basis of 1960's drought is 240 mgd.

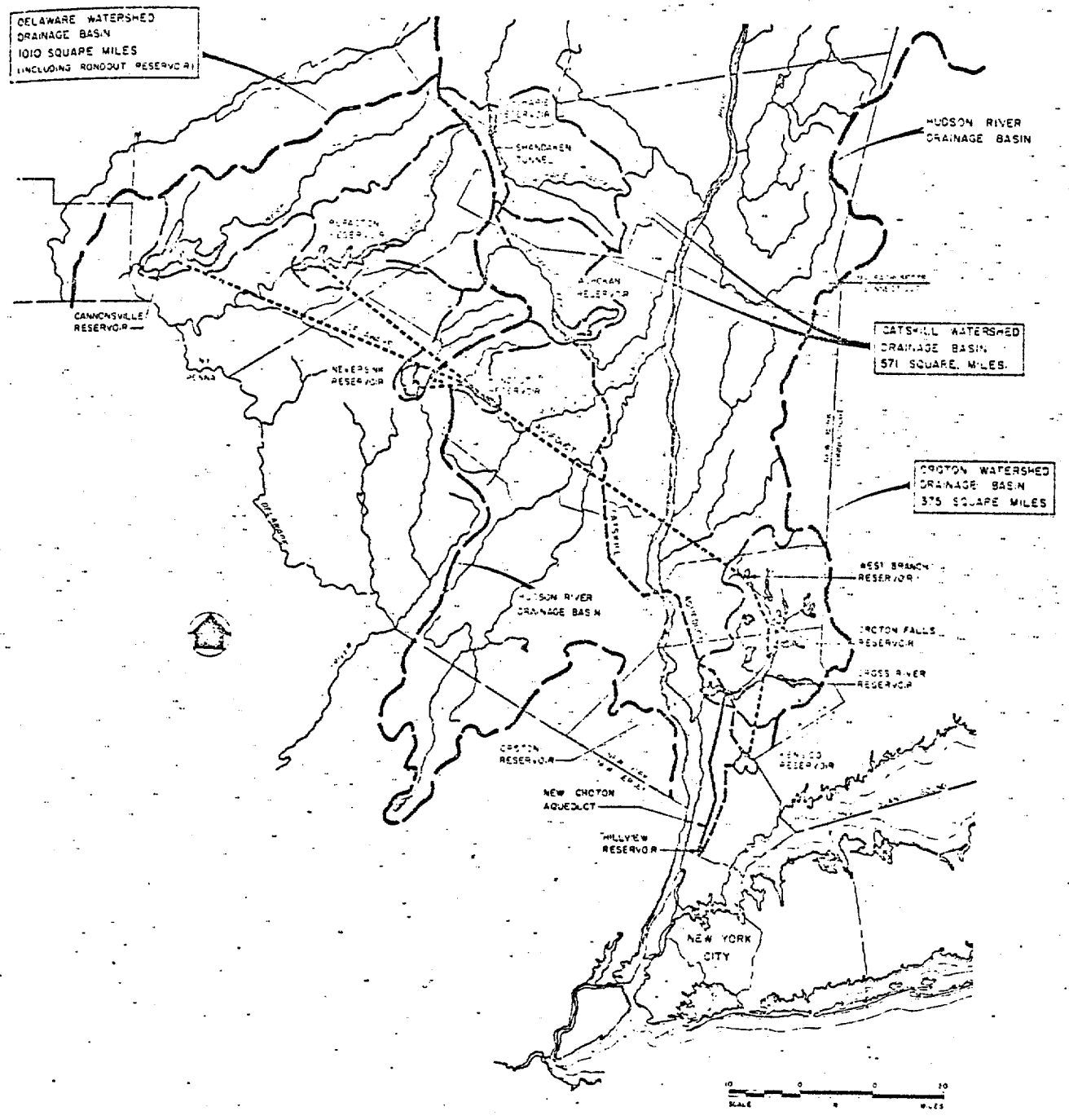
2. Catskill System

The Catskill System gets the runoff from 571 square miles watershed. The total storage of the system in Schoharie and Ashokan reservoirs amounts to 150 billion gallons. The Catskill Aqueduct has a capacity of 600 mgd above Kensico Reservoir, and 800 mgd between Kensico and Hillview. The safe yield, on the basis of 1960's drought flow condition, was estimated as 470 mgd.

3. Delaware System

The Delaware system includes 1,010 square miles of watershed and four reservoirs; Neversink, Pepacton, Cannonsville and Rondout. The total storage of the system amounts to 326 billion gallons. The Delaware Aqueduct is a deep rock tunnel throughout, with a capacity of 890 mgd above West Branch, 1,000 mgd from West Branch to Kensico, and 1,800 mgd from Kensico to Hillview. The safe yield of the system was computed as 580 mgd.

Several local supplies of the City system have limited capacities and have been used only during water shortages such as the 1960's drought. The local supplies include Ridgewood system which withdraw groundwater in Queens and Brooklyn and the Chelsea pumping station which pumps water from the Hudson River.



Existing Surface Water Supplies
New York City
CZM Water Supply Study
Figure IV-2

Investor Owned Water Companies

The Jamaica Water Supply Company furnishes groundwater to about 650,000 persons in Queens. The present output of the company is approximately 60 mgd. The system includes wells, water treatment facilities, pumping stations, storage reservoirs and distribution mains. The well water supplied by the Jamaica Water Supply Company, while less satisfactory than upland sources is of tolerable quality. As the supply of this system is very limited and its quality poor, it is not included with the safe yield of the City water system.

Estimations of Future Water Demands and Potential Water Supply Sources

Future water uses are based upon projections of future population density, prospective industrial development, growth in per capita water usage and other usages.

The present and future per capita water use may be divided into the industrial use and non-industrial use. The latter includes all domestic, commercial, institutional, and public use plus unaccounted for water in the form of leakage and under-registration of meters.

Some industries in the Boroughs of Brooklyn and Queens have their self-supplied water systems. Groundwater is the sole source of these systems. Currently, there are 30 industrial users with their own water supply. Total extraction of groundwater by them amounts to about 28 mgd. Of this, 10 mgd or 36 percent is recharged back to groundwater aquifer. The present consumptive use is therefore 18 mgd. This amount is expected to increase, but it is assumed that all additional industrial water requirements in the future will be met by public supplies.

Total safe yield from New York City public water system estimated on the basis of the recent drought is approximately 1,300 mgd. When compared to the projected water demands, the City water supply is expected to become inadequate by 2000. It should also be noted that the City Water System has to provide water to Westchester and other counties where the City has developed water sources. Table IV-1 gives the latest information on potential water deficits for the NYMA which could be supplied by a regional project. The water deficits are based on information from the Northeastern United States Water Supply Study (NEWS), Corps of Engineers, with certain adjustments made by the NYS Department of Environmental Conservation (DEC). The DEC adjustments were made to take into account latest population projection (1976) by the NYS Economic Development Board (EDB) and also to account for the latest EDB changes in household size.

Many studies including the NEWS study have identified and analyzed new water sources for New York City and surrounding areas. The Hudson River has generally been identified as the best source for a new regional water supply for the NYMA. Detailed studies are in progress under the NEWS study considering a potential high flow skimming project in the vicinity of the Rhinebeck area. A large water intake, treatment plant, tunnels and the NYC third City tunnel are features of a potential project.

Water conservation measures have also been considered in the NEWS study with cooperation from the State and the City. Demand reductions due to metering and leakage control and water conservation devices have been taken into account in the NEWS study.

Boundary Line Determination

Substantially all of the people in New York City depend upon the public water systems for water supply. Major supply sources are located well beyond

TABLE IV-1

Water Deficits for Year 2000
NYS/NYMA

County	EDB. Pop.	EDP Pop. Served by P.W.S.	Industrial Per Capita Demand	Non-Industrial Per Capita Demand	Net Per Capita Demand	Net Water Demand MGD	Local Supply	Water Deficit
Dutchess	328	276	40	167	207	57	35	22
Nassau	1350	1350	31	130	161	217	151	66
Orange	463	412	33	139	172	71	69	2
Putnam	130	112	26	110	136	15	1	14
Rockland	380	369	48	201	249	92	60	32
Suffolk	1866	1754	39	163	202	354	466	-
Ulster	223	172	23	97	120	21	15	6
Westchester	873	847	31	129	160	136	28	108
NYC	6876	6876	38	157	195	1341	1290	51
NYS/NYMA	12489	12168	37	151	188	2304	-	301

the City limits. Therefore, no particular consideration is needed in the City from the water supply standpoint in establishing the coastal zone boundary. It is noted that groundwater is used to a limited degree in Queens and the coastal zone boundary lines should be determined in the same manner as for the rest of Long Island.

Areas for Protection

In New York City, practically all the water supplied is from upland reservoirs. Therefore, the areas inside the coastal zone do not need land use control or other measures to protect water supplies.

Parts of the Queens and Brooklyn boroughs use groundwater as their sources. So far, the Jamaica Water Supply Company's wells have suffered little from salt water intrusion. In order to keep the water quality acceptable, any increaseduse of groundwater should be carefully examined.

SECTION V

LONG ISLAND SUBAREA

GENERAL

The North and South shores of Long Island contrast sharply in physical features. The North shore tends to be rapid high rise, cliff-like shore lines while the South shore is a glacial outwash plain which includes off shore barrier beaches. The narrow North and South "forks" on the easterly end of Suffolk County maintain these respective characteristics as they taper to land points in the Atlantic Ocean. Due to these geographical features the Long Island subarea is broken down into separate north and south shore zones. Both forks due to their narrowness and by being virtually surrounded by salt water are treated as complete coastal units. The potential coastal zone areas are shown on Figure V-1.

All of the water supply systems on Long Island use groundwater as their source of supply. In effect, the island is a big bubble of fresh water surrounded by salt water. Excessive pumping will reduce the size of the bubble which will cause salt water intrusion into some wells. Maintenance of the fresh water bubble has been undertaken by the Department of Environmental Conservation.

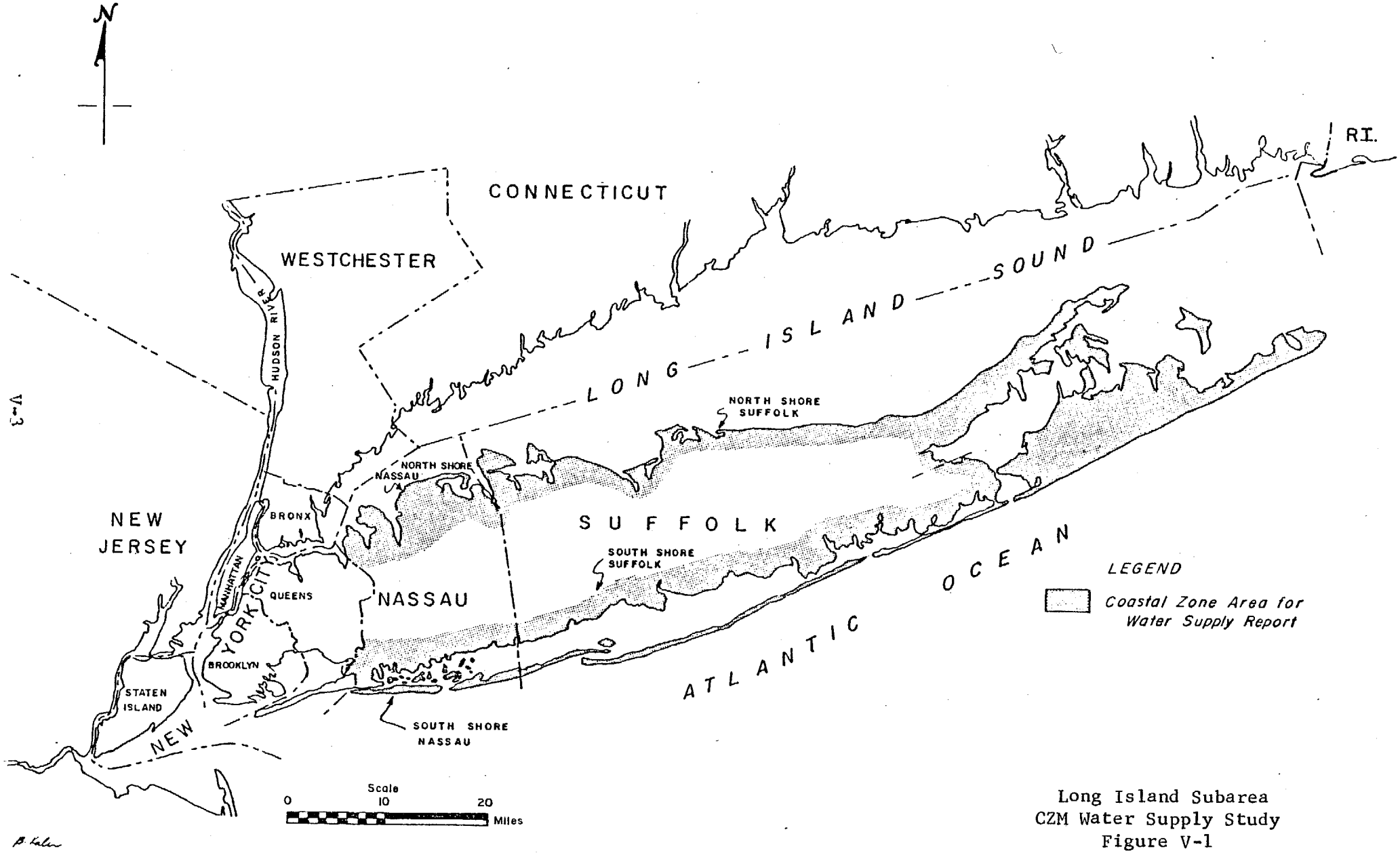
The Long Island coastal zone area does not appear to be in a precarious state at the present time due to current water supply practices. The New York State Department of Environmental Conservation's responsibilities regarding decisions on water supply applications for expansion, increased pumpages, new locations etc., have aided greatly in protecting the underground reservoir. Restrictions on pumping in shore areas and requiring new wells to be located inland are perhaps the most important actions that have kept the Long Island shore area secure from salt water intrusion.

While the study area does not have any major conflict with coastal zone resources and present water supply needs, significant population increases

especially in the eastern forks of Suffolk County can jeopardize the fresh water-salt water and ecological balances. Water quality deterioration of the underground reservoir must, also, be considered with population expansion.

The predictibility of changes in the coastal zone area under various proposed water management alternatives should be greatly enhanced under the ongoing PL 92-500 Section 208 waste water management study. The 208 study being conducted under the Nassau-Suffolk Regional Planning Board includes a computerized model study for the Long Island ground water system. Any water management determinations should await the 208 study results.

From a water supply point of view, the concept of managing a strip of land along the coastline does not appear practical. The entire island is interrelated hydrologically. What happens in the middle of the island can affect the water supplies along the coastline. Since the Department of Environmental Conservation is virtually managing the groundwater of Long Island through its permit program, coastal zone management for water supply purposes for Long Island is not needed.



Long Island Subarea
CZM Water Supply Study
Figure V-1

Nassau County

Nassau County, an area of about 300 square miles located on Long Island, is bordered on the west by Queens County (N.Y.C.) and on the east by the Suffolk County boundary. The north and south boundaries are Long Island Sound and the Atlantic Ocean respectively. The barrier beach area on the Atlantic is separated from the mainland by a bay area which contains dozens of marsh and wetland islands which are an important part of the local ecology.

The North Shore coastal area is broken into five distinct bays and harbors. (Little Neck Bay, Manhasset Bay, Hempstead Harbor, Oyster Bay and Cold Spring Harbor) between the New York City and Suffolk boundaries. The shoreline is characterized by steep slopes or bluffs, many of them wooded, with narrow sandy or rocky beaches. In some instances the land elevation is over 100 feet above sea level less than 1,000 feet from the shoreline. Such features have limited access and shoreline development, but there are lowlands and previously filled wetlands particularly at the heads of harbors which have major residential and commercial development.

Nassau County has rapidly transformed from a semi-rural suburb of New York City with a population of 400,000 in 1940 to a present dynamic urban center of approximately 1.5 million residents, with the largest concentrations in the South Shore area. Present (1975) LILCO population estimates indicate 204,000 people now located in the mainland study area and 47,000 within the Long Beach, Island Park areas; averaging over 12 persons per acre. With less than 5% vacant land remaining in the South Shore study area, and with the Nassau-Suffolk Comprehensive Development Plan indicating the subject area may expand to complete medium to high population densities, apartment and high-rise type dwellings will be part of future development.

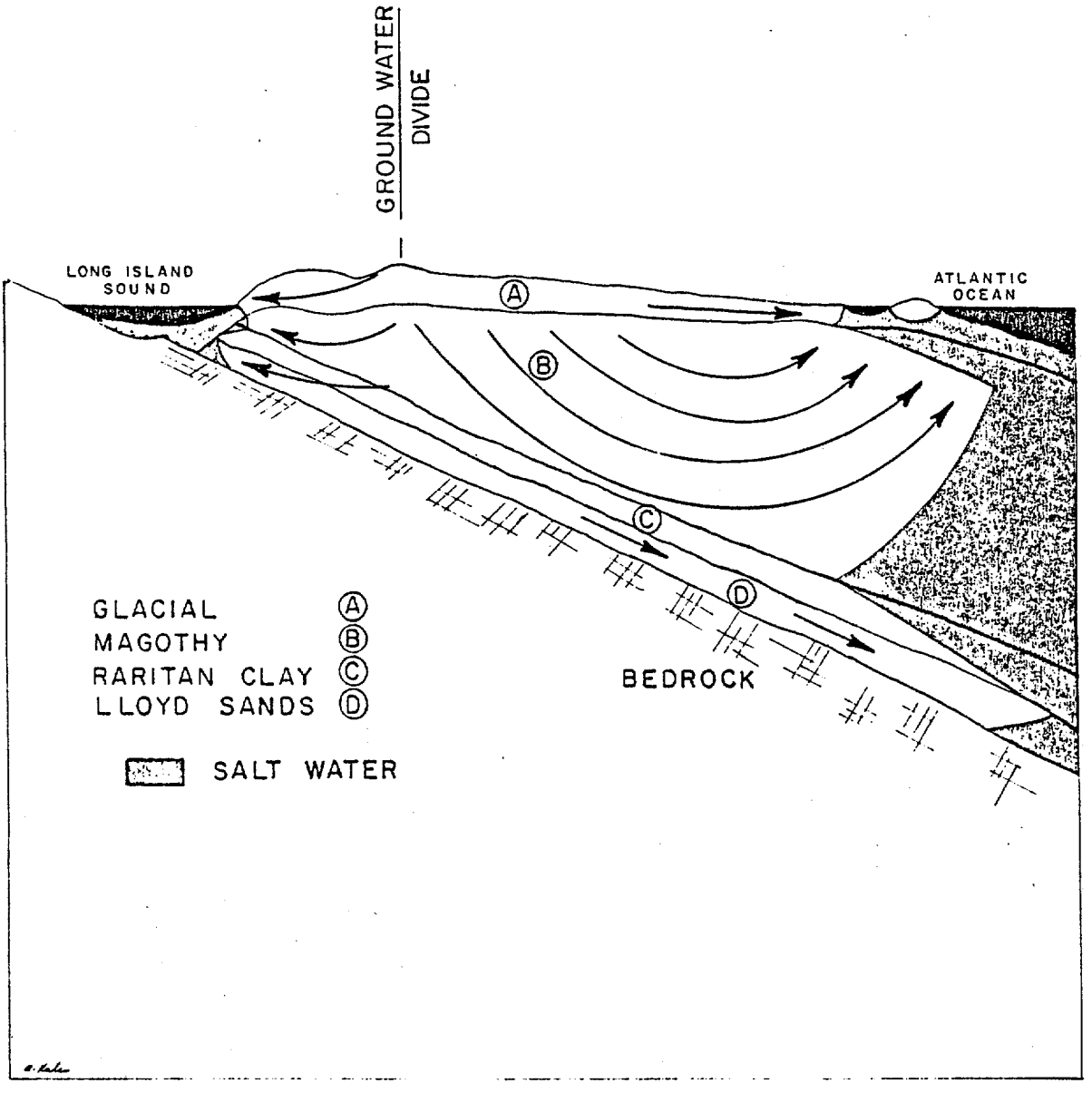
All water supply is from groundwater sources and all groundwater orginates from precipitation that falls on the county. Half of the average precipitation of 45 inches infiltrates into the groundwater reservoir and the remainder is lost by evapotranspiration and direct runoff into tidal water.

Sandy unconsolidated deposits which underlie the county make up the three major aquifers used for water supply. The Glacial aquifer is the uppermost and is readily accessible for water supply. The Magothy aquifer is directly below and is the largest, accounting for 80% of the public pumpage. The Lloyd formation is the deepest aquifer and lies above bedrock and under a Raritan clay layer.

The groundwater flows away from the groundwater divide near the central portion of the county towards Long Island Sound and the Atlantic Ocean at about 1 foot per day. Near the groundwater divide, a downward component of flow serves to recharge the deeper formations. As the groundwater moves toward the shoreline an upward flow component exists. Thus, recharge water in the inner portion of the county eventually will be a part of and interact with the shallow coastline subsurface flows into Long Island Sound and the Atlantic Ocean. Figure V-2 illustrates the groundwater movement across the island.

Public Water Supply Systems

Nassau County has 18 municipal and 6 privately owned public water supply systems within the potential coastal zone area, as shown in Figure V-1. The northern and southern zones are described briefly below.



CROSS SECTION NASSAU COUNTY-GROUND WATER FLOW

Ground Water Flow
CZM Water Supply Study
Figure V-2

South Shore Water Supply Area

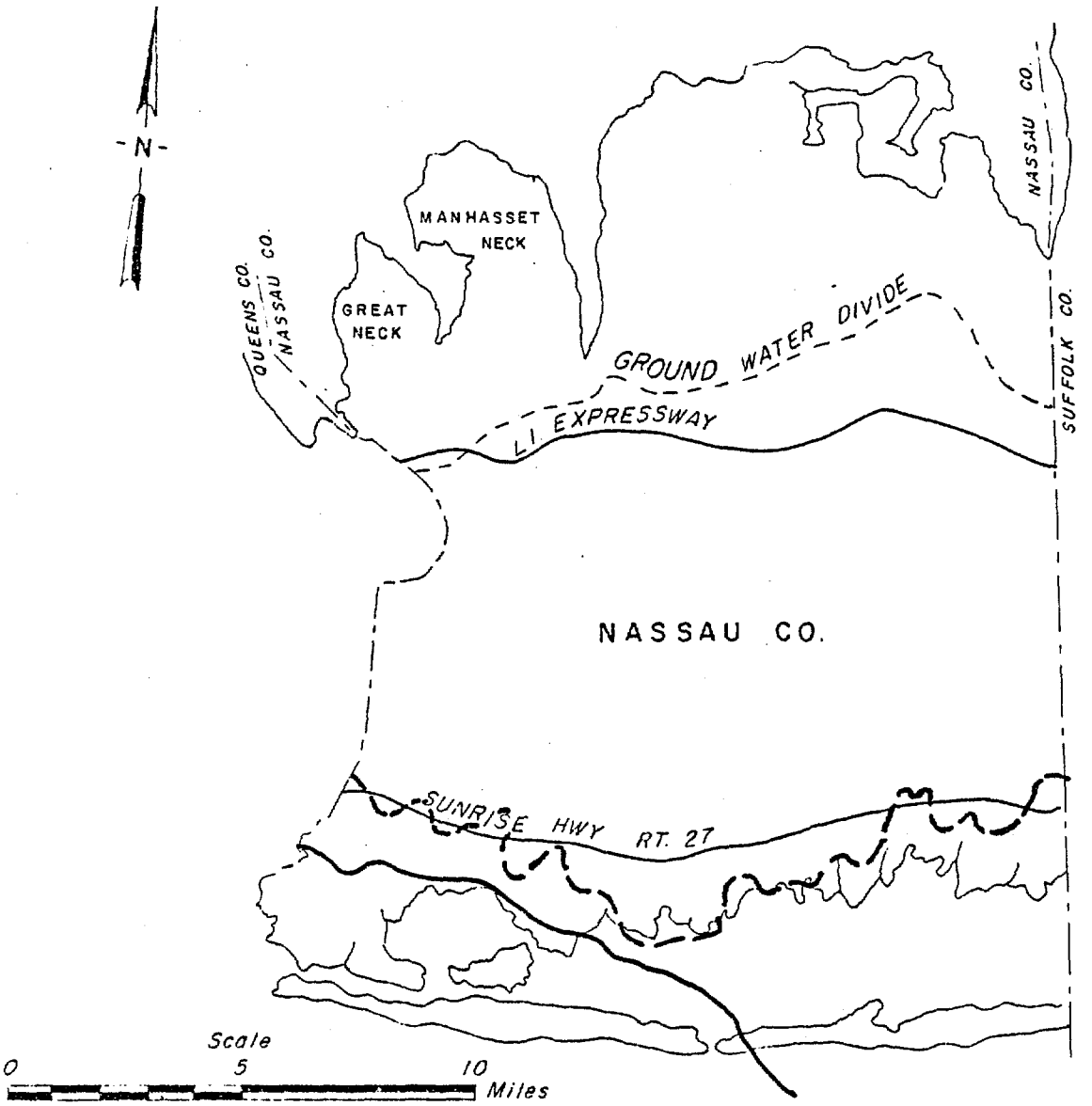
The study area's public water supply needs are served by five municipal and two private suppliers. All water is obtained from wells. All of the suppliers franchised areas, with the exception of the City of Long Beach and Lido-Point Lookout, extend beyond the study area boundaries. The total pumpage for public water supply wells within the study area, however, averaged 12 mgd (1974).

The greatest withdrawals within the study area were from the Lloyds aquifer (6.3 mgd) followed by the Jameco (4.0 mgd), Magothy (1.6 mgd), and Glacial aquifers (0.2 mgd). The study area encompasses an area outside the hydrologically-defined water budget area of Nassau County (Greeley-Hansen Study-1971) and thus all pumpages for the study area exceed the permissive sustained yield allowances as defined by the Greeley and Hansen Study. The county total permissive sustained yield for an average year is 151 mgd, which is projected to be exceeded by 1985.

Since 1954, glacial pumpage has dropped in Nassau County from 15% of the total pumpage to less than 5% while the Magothy pumpages increased from 72 to 85% of the total pumpage. This is a result of shutdowns and reduced glacial pumpage due to wells having high nitrates, iron, detergent or ammonia concentrations.

Saltwater encroachment is another serious concern in the study area aquifer. The U.S.G.S. has confirmed bodies of salty groundwater or wedges under southwestern Nassau County in each of the four aquifers. The appropriate landward limit of the four wedges has been delineated by Lusczynski and Swarzenski, 1966(See Figure V-3).

Recognizing the sensitivity of the area to increased chlorides with increased groundwater withdrawals, the former New York State Water Resources Commission and



APPROXIMATE LANDWARD EXTENT OF INTERMEDIATE WEDGE OF SALTY GROUND WATER

APPROXIMATE LANDWARD EXTENT OF DEEP WEDGE OF SALTY GROUND WATER

*REF. : POSITIONS OF SALTY WEDGES AFTER LUSCZYNSKI & SWARZENSKI (1966)

Saline Water in Nassau County
CZM Water Supply Study
Figure V-3

the Department of Environmental Conservation have prohibited new well construction south of the Sunrise Highway. Existing mainland wells, which are now south of Sunrise Highway, are usually within a few hundred feet of the highway boundary. The barrier beach section, which includes Atlantic Beach and City of Long Beach, lacks any tie-in to mainland water supply sources and has historically had quality problems with chlorides in the shallow aquifers. As a result, all barrier beach public suppliers now have wells exclusively in the lower Lloyd formation.

The Lloyd formation rests above the bedrock formation and is considered the last resort for water supply in the Long Island aquifer system. The Department of Environmental Conservation practice is to protect the Lloyds whenever alternative sources are available. This is in part due to the experience with the Brooklyn area, where high population and geographic and hydraulic conditions similar in most respects to southern Nassau suffered drastic water-level reductions and severe salt water intrusion due to overpumping in the 1930's. This resulted in abandonment of all Brooklyn groundwater wells as a source of public water supply to the problem areas.

The quality of Nassau groundwater has undergone deterioration with nitrates and detergent problems which have been documented by several reports. Some local situations involving thermal and industrial waste contamination are potential threats to groundwater quality, but widespread abuses, if existing, have not been highlighted. Recharge of treated STP effluents in the shore areas has at various times been proposed to protect the underground freshwater from salt water intrusion. However, distances to the water table are shallow throughout this shore area. Prospects for recharge are poor as little soil medium would be available for filtration and any high-quantity recharge would ultimately affect the bay water salt concentration and existing estuary limits from a dilution standpoint. The quality and nature of the recharge, of course, would demand further consideration of the local ecology. While recharge is technically feasible, detailed ecological studies from the effects of recharge have not been conducted to date.

North Shore Water Supply Area

Public water supply needs within the defined coastal zone are furnished by 13 municipal and 4 privately owned suppliers. In 1974 these suppliers pumped an average of 38 million gallons per day from 105 wells within the greatest pumpage from the Magothy aquifer.

Public water supply pumpage in the Great Neck and Manhasset area has induced changes in the natural freshwater saltwater interface and at times drastically lowered the groundwater table. The Glacial aquifer is limited for pumping water as it is believed to exist only as valley fill of the Magothy aquifer. The Magothy structure tends to be quite clayed in these areas and some wells intended for public water supply were abandoned due to poor yields. Saltwater intrusion occurred in Lloyd wells due to overpumping in the 1950's when chloride content jumped from a range of 5 to 15 parts per million to 65 parts per million. Wells in all aquifers in the Port Washington Water District are affected by increased chloride levels during increased summer pumpage.

In several cases among the various water suppliers located near the shoreline, groundwater levels dropped below sea level during periods of peak pumpage. For example, the Citizens Water Supply Company has had pumping levels as low as 68 feet below sea level on peak days.

The former New York State Water Resources Commission recognizing the consequences of overpumping in the peninsula areas imposed conditions and restrictions on existing wells and regulated capacities on wells constructed during recent expansion. As a result observation wells are now used to monitor pumping and pumping cannot continue on certain wells if drawdown levels in observation wells are lowered beyond designated elevations and/or chlorides increase to 50 parts per million.

Due to these sensitivities the Department of Environmental Conservation disapproved the Port Washington Water District's request to construct wells within their own district, but approved the construction of two wells inland where drawdown and chlorides are not critical.

Inland wells in some instances have had water quality problems with nitrates. The United States Geological Survey conducted a study of nitrates between 1966 and 1970 and nitrate content exceeded the drinking water standards of 10 mg/1 in Glacial and Magothy wells in substantial portions of the mid-Nassau area. Computations indicate insufficient dilution under Nassau County to bring nitrate nitrogen concentrations below 10 mg/1 in unsewered areas where the population density is in excess of 3 persons per acre. With the Glacial formations showing the most serious deterioration, communities have moved their wells to deeper formations. This may only be a temporary expedient as degradation indicated by increasing nitrate content extends downward into the Magothy formation. This movement is encouraged in part by pumping of deeper wells in addition to natural flow. In 1973, the wells of 25 of 384 communities in Nassau County exceeded nitrate nitrogent drinking water standards with the heaviest concentration in the northern and central portion. Some steps taken to cope with degradation of water quality are blending water from 2 or more wells and deepening wells. Ion-exchange nitrate removal plants are being investigated and one such plant is presently in operation and being tested.

A study of the public water supply in the coastal zone area requires an examination of the inland and mid-island sources. The present concept of the natural underground flow is that the deeper mid-island water is the potential water which travels outward to the shoreline sectors (Figure V-2). Freshwater contained within the coastal zone sector is contiguous to the inland supply. High public water supply withdrawals in the coastal areas lead quickly to changes in the saltwater-freshwater balance mechanism both from capturing the normal freshwater outflow and the accompanying drawdown effects. However, groundwater flows between the three main Long Island aquifers and their

inter-relationship with the non-static freshwater-salt-water interface are thought of as separate units and vary individually in respective water quality and boundary limits.

Areas of Protection

This study shows that a close relationship exists between the entire water use throughout Nassau County and the interface between the fresh and salt water under the potential coastal zone. Although the entire ecological effects were not discussed in this report, an awareness of the potential loss of fish and wildlife habitat due to overpumping of the groundwater aquifer exists. Regulation of a strip of land along the coastline for water supply purposes is not required. To include the entire island in the coastal zone and to impose regulations for water supply purposes duplicates the activities of the Department of Environmental Conservation and is not needed. No areas need protection for water supply purposes.

Suffolk County

Suffolk County comprises the eastern two-thirds of Long Island and includes a land area of about 922 square miles. Its western boundary is Nassau County and the remaining three sides are bounded by water. Suffolk County is recognized as a major suburban area of New York City with extensive residential and industrial development and a total population of approximately 1,300,000.

The source of all freshwater in Suffolk County is precipitation which is transmitted to the main groundwater body as recharge. Nearly all the public water supply is from wells tapping the groundwater reservoir. The only exception is Fishers Island located about 12 miles northeasterly of Orient Point in Long Island Sound. Fishers Island, with a year round population of less than 500, has some runoff fed ponds which are used as the primary public water supply.

The Suffolk County shorelines are bounded by Long Island Sound on the north; the Great Peconic Bay on the east forming several other bays and the Atlantic Ocean off the barrier beaches to the south. The shorelines total 784 miles, with the Long Island Sound shoreline 191 miles, the south shore bays 239 miles, the Atlantic Ocean 92 miles and the Great Peconic Bay 262 miles.

Geologically, Suffolk County is similar to Nassau County as shown in Figure V-2. The County is composed of unconsolidated sediments resting on a Pre-Cambrian rock base which vary in depth from 400 to 1800 feet below sea level. The deepest aquifer is the Lloyd sand formation, 150 to 300 feet thick, which lies above the bedrock. A Raritan clay layer (100 to 300 feet thick) overlies the Lloyd sands. Above the Raritan clay is the Magothy formation ranging from 200 to 1000 feet thick making up the Magothy aquifer. Glacial deposits form the uppermost Glacial aquifer, which in places may be as much as 700 feet thick in buried Magothy valleys, but averages 100 to 200 feet thick.

A primary consideration of water suppliers is the location of interface between fresh and salt water. With the exception of a very few localized areas, there has been no salt water encroachment to date in Suffolk County and the position of the interface is a result of natural equilibrium. Studies are being made continuously of the interface. In eastern Suffolk County, the knowledge of the position of the salt water - fresh water interface has been expanded significantly through the findings of the Suffolk County Test Well Program. Test borings for five deep test wells on the South Fork penetrated the fresh water - salt water interface.

Public Water Supply Systems

Over 67 wells are known to be located within the potential coastal zone area, as shown on Figure V-1. The northern and southern areas are described below.

Suffolk County North Shore Water Supply Area

The north shore water supply area has an estimated population of 120,000. The population density varies from 1400 persons per square mile in the western area to less than 400 in the eastern portion.

Generally, like Nassau County, the north shore of Suffolk County consists of lightly wooded bluffs which ascend steeply to a height of 30 to 100 feet or more from narrow sandy-gravel beaches. The upland or inland areas on the western end of Suffolk County are heavily residential, but a noticeable drop in population densities starts from the Riverhead area eastward where the residential character changes to agriculture and remains so to Orient Point.

Over fifty well sites exist in the defined North Shore zone with dozens of the well sites belonging to small privately owned suppliers, which furnish specific developments or operate seasonally in the eastern portion of the coastal area. There are an estimated 40,000 or more residents in this study area using private domestic wells with the total water withdrawals ranging from 10 to 20 million gallons per day.

From Nassau County east to Riverhead, there are only a few and relatively minor concerns regarding public water supply when compared to the southern coastal zone area. From Riverhead east, however, due to the narrowness of the North Fork, the fresh water supply and balance is much more sensitive than any place else in Suffolk County.

On the North Fork salt water lies much closer to ground surface than on the South Fork. A county test well program revealed a clay layer existing in the north fork Cutchague community. Rapid salt water intrusion occurred in a test well which penetrated the clay layer. It is believed the clay layer acts as a basin for recharged fresh water. This test domonstrated the need to keep wells on the North Fork above the clay layer. Only a limited number of wells on the North Fork penetrate the level of this clay layer. Sufficient data is not available to determine the extent of the clay. If it covers a large area of the peninsula, it protects the overlying wells from upland salt water encroachment.

In the vicinity of Greenport, the salt water interface lies above the level of this deep clay. Public supply wells in this area are extremely susceptible to salt water intrusion since salt water is present close underneath the wells as

well as on either side. Extended heavy pumpage periods have caused the chloride content in one of the well fields to increase to about 500 mg/l. Efforts by the Village to minimize this problem and to increase the available fresh water supply by pumping stream or pond water to the well field for spreading and recharge have been successful in reducing and maintaining the chlorides to acceptable limits. Other Village well fields have experienced increases in chlorides but not beyond drinking water standard limits. Water development in this area has been with reasonably small capacity wells to reduce the local pumping cone of depression. This has reduced the tendency for vertical movement of the salt water interface. The natural yield of the immediate area of the Village is nearly completely developed and the water system has been extended to outlying areas for additional supply.

Suffolk County - South Shore Water Supply Area

The South Shore Coastal area has an estimated population of 240,000 people with highest densities occurring in the western end. There are twenty-four corporately owned well sites located on the mainland between Nassau and Shinnecock which furnish over half of the area's public water supply.

There are also seventeen public supply well sites on the barrier beaches. Many of these provide water for seasonal water supply users in summer communities. A great many residents within the south shore coastal area, exclusive of the South Fork, are supplied from inland public supply wells located outside the potential coastal zone boundaries. As many as 60,000 residents depend on private domestic wells and the total withdrawal from the area is estimated to range from 17 to 30 million gallons per day.

Assuming the safe yield of one million gallons per day per square mile generally accepted for the inland area of Suffolk County, the population in the coastal area west of Shinnecock can be adequately served in the foreseeable future without environmental consequences even with anticipated population increases. The NYS Department of Environmental Conservation requires permits for all public water supply well construction and is exercising current powers for spacing, pumping, and monitoring of public supply withdrawals as a result the NYS DEC is alert to the cological considerations of public water supply. It does not appear for the coastal area west of Shinnecock, that any limitations are warranted due to water supply considerations.

For the south fork, however, future population expansion may stress the availability of fresh water due to salt water encroachment. Studies of the South Fork show some areas where chloride levels are suspect of being 250 ppm. or greater. For any well located in the low lying coastal areas localized salt water intrusion can be expected to occur.

Areas of Protection

The coastal zones of Suffolk County excluding the North and South Forks do not appear to be in danger from current water supply practices or those that will occur with growth in the foreseeable future. Future supplies can be distributed from wells outside the potential coastal zone. Both the North and South Forks, however, will not tolerate large increased water supply withdrawals without salt water encroachment and accompanying ecological changes. Importing or other alternate water sources can relieve the consequences of overpumping as can land use regulation which would prevent large population and industrial expansion.

The water supply management problems within the subregion and the contiguous areas is also intertwined with water quality and all the ramifications that water management programs have on the quality aspects. The public water supply needs of Suffolk County will be met through either expansion of existing water supply systems or the construction of new facilities utilizing the ground water source. There will be impact on this source as development occurs and more waste water disposal is needed.

Although septic system contamination of ground water is of primary concern, the efforts to provide sewering which lessens the groundwater contamination also decreases the recharge of the groundwater reservoir. With decreased recharge the balance of the salt water - fresh water interface would be changed and any resulting reactions would affect the coastal zone areas.

The on-going PL 92-500 Section 208 wastewater management study for Nassau-Suffolk Counties being conducted under the Nassau-Suffolk Regional Planning Board, is scheduled to investigate effects of sewering and various recharge proposals using computerized model studies. The results of the 208 study should be of great value in making water management decisions benefiting the coastal zone area.

Regulations for water supply purposes within a strip along the coastline is not feasible due to the interrelationship of the groundwater to the middle part of the island. Since the Department of Environmental Conservation already manages the groundwater system for the entire island through its permit system, additional regulations under the coastal zone management program are not needed.

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SECTION VI

RECONNAISSANCE SURVEY

Reconnaissance Survey

After the first part of study determined the water users, their projected needs, and their problems in regards to the potential coastal zone management program, interviews with local water supply interests were planned. These interests included regional planning boards, regional and local Department of Health personnel, municipal water systems, industrial users and private users. Since the interviews were of an informal nature, the results are considered only as personal opinions of professionals dealing with water supply problems, and not as any formal request or position of the agency which employs them. This approach gives us an insight to the problems without worrying about commitments to a specific solution.

Interviews were held in Niagara, Orleans, Monroe and Wayne Counties with 42 people. The majority of the people saw no need for further regulations under the coastal zone management program. Protection of the intakes and the groundwater aquifers are considered important, but many feel that the existing laws are adequate if properly implemented. If for some unforeseen reason additional regulations are imposed, many feel that the coastal zone should have some physically recognizable boundary such as one of the roads that parallel the shoreline. If existing zoning does exist, the coastal zone should adopt the inland limits of the existing zoning. Based upon the results of the 42 interviews, which are summarized below, further interviews were considered unnecessary.

Niagara County

The Niagara River is the source of water supply for nearly all of the water users in Niagara County. Interviews with nine organizations within the county revealed that Erie and Niagara Counties have a master plan for the counties, which provides for supplying all of the water needs from the Niagara River and Lake Ontario. Due to the pumping costs, the county is reconsidering the Lake Ontario proposals. Industrial and agricultural users take their water from the municipal suppliers.

Most of the suppliers interviewed felt that no special protection was needed under the coastal zone management program. Two thought that the major transmission lines should be protected. The representative from the Village of Youngstown expressed a desire to have the boundary for the coastal zone extend to River Road to conform to existing ordinances.

Orleans County

Lake Ontario is the major source of water supply in Orleans County. Interviews were held with six organizations. The results are varied. One thought that no special protection was needed. Others thought that the aquifers should be protected. The coastal zone should be easily defined using Route 18 or some arbitrary distance. Watershed rules were suggested for Oak Orchard Creek.

Monroe County

Monroe County and much of its coastal zone is greatly effected by the City of Rochester and its suburban area. Most of the water is taken from Lake Ontario. Interviews were held with 15 agencies including 8 municipal suppliers, 2 private suppliers and 2 industrial suppliers.

In general, the protection of the intakes and the aquifers was a major concern. Many thought that no special legislation is needed and that existing building codes, zoning laws or watershed rules are adequate. Someone suggested that no water service be provided in flood prone areas, while others suggested protection of the easements and the sludge disposal areas.

Wayne County

Northern Wayne County relies primarily on Lake Ontario for its water supply. Interviews were held with 12 agencies.

The smaller water districts were concerned about protecting the aquifers. Many felt that the existing regulations may be adequate if properly implemented. One suggested that the coastal zone be within the lake only. Watershed rules were suggested for East Bay and Sodus Bay. Another suggested that no water service be provided to wetland areas due to the difficulty in constructing a pipeline in those areas.

Existing Regulations

The widespread opinion of those interviewed was that the existing regulations are adequate. Two agencies have programs that affect the water quality at an intake; these are the Watershed Rules Program administrated by the Department of Health and the Pure Waters Program administrated by the Department of Environmental Conservation. The people in DEC and the Department of Health working with the programs see no need for additional regulations for water supply purposes in the Coastal Zone Management Program. A brief description of the existing regulations follows.

Pure Waters Program

All of New York State's streams are classified under a system administered by DEC, which limits the quality and quantity of wastes that can be discharged into a stream at a given location. The classifications are based upon the best use of the water resource. Administrators of the program evaluate the effects of the waste discharges upon the stream and the water intakes downstream from the point of discharge. Each classification sets limits on types of waste discharges, but a higher level of treatment than indicated by the stream classification may be required by DEC if the discharge is judged to have a detrimental effect upon a downstream intake. The differences in the classifications between the lakes and the streams are due to the physical mechanics of a standing body of water and a free flowing stream. The general principle is to protect the quality of water at the nearest downstream intake.

Watershed Rules

Any water purveyor can protect its source by having Watershed Rules enacted by the New York State Commissioner of Health under Section 1100 of the Public Health Law. After receiving a request for watershed rules, the Commissioner orders a sanitary survey to determine the limiting distances from the source that junkyards, waste discharges and other elements detrimental to water quality may be located. Watershed rules can apply to both surface and groundwater sources. Watershed rules cannot be used for private or industrial intakes. The Department of Health is primarily concerned with the quality of water being extracted from the stream and whether the water can be treated for public consumption.

Discussion

The primary concern of the water supply task was to determine what is needed to protect existing and future water users in the coastal zone. Evaluation of the problems resulted in the conclusions that the water users of the coastal zone are no different than those in the remainder of the State and that no special regulations for coastal zone management are needed although changes in existing laws may be advisable to protect private and industrial users.

The Pure Waters Program administrated by DEC limits the discharges of wastes into any water course within or bordering the State. Any needed changes in the existing classifications can be made under the existing laws. Slight changes in water quality at the intakes could occur due the natural and the allowable man made causes, but no adverse changes are expected. Adverse changes in water quality by accidental spills, etc. can always be mitigated through the judicial process.

The Watershed Rules Program administrated by the Department of Health applies to both the surface and the groundwater sources. For the coastal waters, the watershed rules do not appear applicable due to the "Watershed" connotation and the large quantity of water in the receiving water courses in relationship to potential discharges. Some tributaries flowing through the proposed coastal zone could probably use watershed rules, but those are local problems that are not of special concern to the results of the coastal zone management program. Other watersheds outside the coastal zone could probably use watershed rules too.

The groundwater aquifers within the coastal zone are no different than those outside of the coastal zone from a water supply point of view. The watershed rules restrict the location of potentially hazardous materials to a certain horizontal distance from the well. Our geologist reviewed the model regulations and advises that changes could be made in the existing regulations. However, no special regulations are needed for coastal zone management.

The County Comprehensive Water Supply Studies identified two aquifers within the coastal zone area which have not been developed. Consideration was given to the concept of preserving these aquifers from degradation under the coastal zone management program. Since the aquifers are undeveloped, their safe yield is undefined and will not be defined until the aquifer is developed. The lack of good geologic information is a good reason for caution in developing new regulations. In addition, other aquifers both developed and undeveloped are located outside the coastal plain which should not be treated differently. For example, the Spring Valley Water Company in Rockland County has 42 existing wells. Two of these are located within the potential coastal zone. There is no good reason why these two wells should have additional regulations on them.

Conclusion

As long as private, municipal and industrial water users are allowed to continue and expand their use of the waters within the coastal zone, no special consideration is needed for water supply purposes under the Coastal Zone Management Program.

Regional Facilities Outline
Task 8.10

I. Introduction General

A. Goals and Objectives
B. Definitions
C. Study Area
D. Data Base
E. Planning Parameters

II. Ports and Harbors

A. Introduction
B. Commercial Harbors

1. Buffalo
   a. description
   b. economic impact (table by county)
   c. development plan
      (1) illustration
      (2) b/c ratio

2. Rochester
   a. description
   b. economic impact
   c. development plan
      (1) commodity flow
      (2) illustration

3. Oswego
   a. description
   b. economic impact
   c. development plan
      (1) commodity flow
      (2) illustration

4. Ogdensburg
   a. description
   b. economic impact
   c. development plan
      (1) commodity flow
      (2) illustration
      (3) b/c ratios

5. Albany
   a. description
   b. development plan
   c. economic impact

6. Port Development Issues
   a. Organization
   b. Finances
   c. Solicitation
   d. Winter Navigation
   e. Environment
   f. Power

7. Recommendations

C. NY and NJ Port Authority

1. Port Admin and Facilities

2. Shipping in the Port of NY

3. Future Forecasts

D. Great Lakes Recreational Harbors

1. Great Lakes Harbors:

1. Barcelona
2. Lake Erie State Park
3. Dunkirk
4. Cattaraugus
5. Grand View Bay
6. Sturgeon Point
7. Hamburg
8. Four Mile Creek State Park
9. Wilson
10. Olcott
11. Golden Hills State Park
12. Johnson Creek
13. Oak Orchard
14. Hamlin Beach
15. Braddock Bay
16. Cranberry & Long Ponds
17. Irondequoit
18. Pultneyville
19. Great Sodus
20. Port Bay
21. Little Sodus
22. Mexico Bay
23. Port Ontario
24. N. Sandy Pond
25. Henderson
26. Sackets Harbor
27. Chaumont Bay
28. Cape Vincent
29. Clayton Harbor
30. Alexandria Bay
31. Morristown
32. Little River

2. Existing Condition

harbor and channel
waterfront and surrounding

3. Trends

4. Major Problem

5. Environmental Considerations

6. Major Issues

Salmonoid Stocking
Navigation Season Extension
Lake Level Regulation
Recreational Developments

E. Hudson River Recreational Harbors

1. Recreational Boating

Marinas and Berths
Launching Ramps
Recreational Waterway Use
Problems and Needs

2. Waterway Functions and Use

Navigation
Channel Maintenance
Debris Drift
Ice

3. Management Alternatives

F. Mineral Resources

1. Identification

2. Protection and Development Alternatives

G. Solid Waste Disposal Sites

1. Identification

2. Criteria for Siting

3. Development Alternatives